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FEBRUARY 11, 1943

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The IRON AGE

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These men of our submarine forces *know* engines. For they literally live *with* and *by* the Diesels which carry them to their enemies and bring them back.

Many of those engines are Fairbanks-Morse Diesels. We are proud of their performance record. We are glad that we can thus serve the officers and men who man the submarines of the United States Navy.

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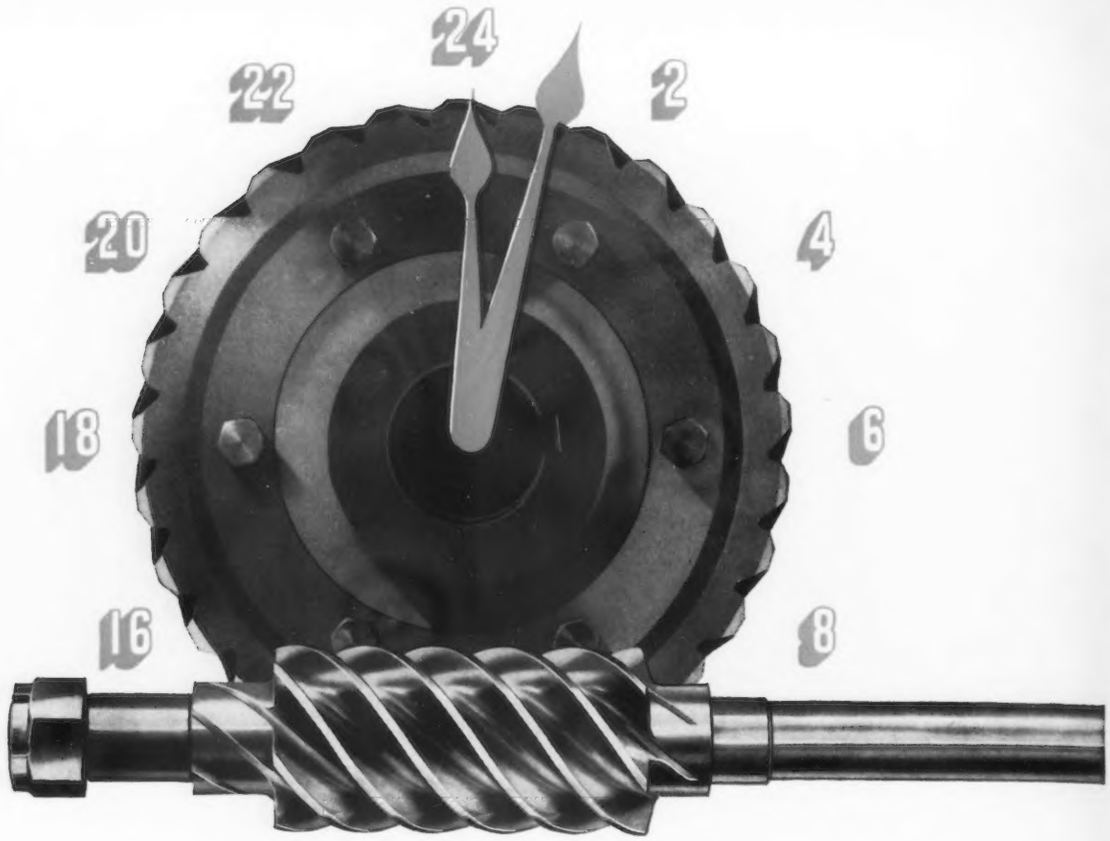

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ABC ABP

Reporting on Current Steel Stocks

As you may know, the steel warehouse industry entered the war period with large and complete stocks. These reserve stocks of steel enabled industry to switch over quickly from peace to war production. However, in the process, stocks of steel in the warehouses of the country became seriously depleted. In fact, these great sources of emergency steel became almost non-existent.

No matter how carefully plants are maintained and production programs scheduled, there are always times, particularly under our heavy war load, that certain lots of steel must be secured immediately or production is imperiled. So companies working at top speed and embarrassed by their inability to secure steel quickly from warehouses, began reporting their problems. The War Production Board was quick to grasp the situation and assign special allotments to the warehouses. A bad situation is now gradually being improved and we are glad to report that our stocks are somewhat better assorted.

In order to eliminate the time required for many roll changes and so to permit increased overall production of steel, we are concentrating on the most generally used sizes. In spite of this curtailment of our usually very broad range of sizes we are now better able to serve than at any time in recent months.

When you need steel or have a problem of selection or fabrication, get in touch with your nearest Ryerson Steel-Service Plant. Our engineers and metallurgists will be glad to work with you. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

THE IRON AGE

FEBRUARY 11, 1943

ESTABLISHED 1855

Will Everybody Lose the War?

LAST week, I wrote about the common denominator that must be found between capital and labor in this country not only to win the war but to win the peace.

The peace will be won—and the war too, not only if we succeed in making this a better country in which to live than any other country in the world—it has always been that—but by making America even better industrially, than it has been before. Better for everybody.

We shall have to go some to do that.

This year, for example, we will pile on the world bonfire and burn up the equivalent of a whole year's work of every wage earner, of every salaried person, of every professional worker, of every domestic and public servant. And in addition, we shall pile on it and burn up in war the equivalent of every dollar of profit earned by every stockholder or employer and every dollar of income received by every recipient of insurance, annuity or pension. That is what it will mean to spend $100 billions for war in 1943.

No man, and no nation, can burn up a year's income and expect not to feel it, especially when he already had gone into debt previously by an almost equal amount. And that is exactly our status.

Any man in that situation would know that he would have to work harder than ever and produce more than ever just to get back where he started from. And that's exactly what America will have to do.

If we expect to better our situation in the future, let alone getting back to where we started from and let alone feeding, financing and rebuilding the rest of the world, we shall have to keep every factory in this country, every mill, every mine turning out useful and needed products for peace, just as we are now turning out needed products for war. Because products, not dollars, are wealth.

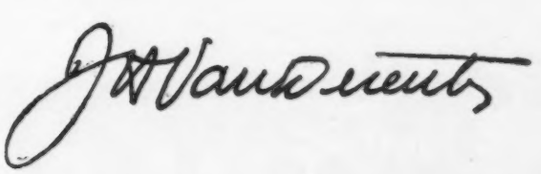
If this were not true, all we would have to do would be to start the printing presses rolling and turn out enough $10,000 bills to make everybody happy. But if there were not things enough to buy, the money would not be much good.

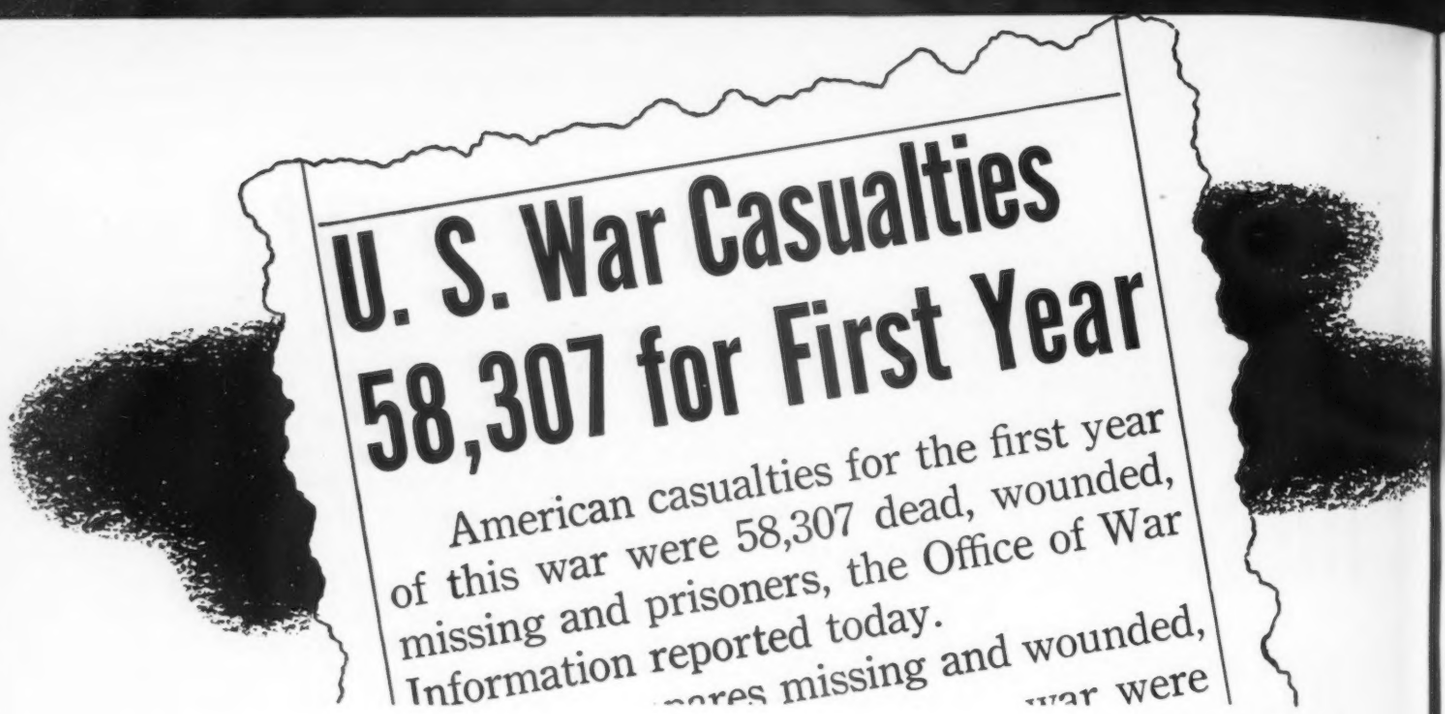
Capital, or management, and labor have declared a truce for the duration of the war, which with some exceptions is being pretty well observed. But this is not enough. What is needed is not a truce, which means a temporary cessation of hostilities, but a declaration of peace and a firm resolve to work together.

We know now, from our experience of the past year, that American management and labor can perform miracles of production when they make up their minds to it and forget their differences. And those differences, in the past, have largely concerned the question of the division of a total that apparently was not enough to go around.

The great common ground for everybody is to produce so much that it will be enough to go around. Enough not merely to go around, but to pay something off each year on the staggering debt that will confront us when the war ends.

If we just stop fighting the Japs and the Germans afterwards and resume fighting each other for a share of that which isn't, everybody will have lost the war no matter who wins it.




U. S. War Casualties
58,307 for First Year
American casualties for the first year
of this war were 58,307 dead, wounded,
missing and prisoners, the Office of War
Information reported today.
missing and wounded,
were

But, Home Front Accidents Exceed War Casualties . . . . over 150 to 1

Home front accidents are occuring at the yearly rate of about 100,000 killed and 9,000,000 injured. Compared with America's Army and Navy war casualties of 58,000 during the first year of war, the ratio is one fighter lost to more than 150 Americans killed, permanently disabled, or injured.

This ratio is tragic. It tells the grim story of lost war production—of thousands of planes, tanks guns, shell, that never will reach our fighting men.

Where do most home front accidents occur? Traffic and public accidents accounted for 53% of the total killed and 34% of the injured. Home accidents resulted in 30% of the deaths and 49% of the injured. On-the-job accidents accounted for 17% of the killed and 17% of those injured. Incidentally, these figures prove that workers are safer on the job than they are anywhere else.

Conservation of manpower is tremendously important, not only when men are on the job, but throughout all their *active day—on the street, at recreation, and at home.*

Inland, with one of the best safety records in the steel industry, is taking every possible step to conserve manpower—by maintaining a large and efficient safety department, and a thoroughly equipped clinic—by constantly coaching men on safety inside as well as outside the plant—by cooperating with local agencies, and by subscribing to the War Production Fund to Preserve Manpower.

Act now to conserve manpower and increase war production!

You can help by making sure that your Safety Program does not lag. Enlist today in the national crusade against accidents. Write for full information to the National Safety Council's War Production Fund to Conserve Manpower, Chrysler Building, New York, N. Y.

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas C

Forging and Welding 1000-Lb. Aerial Bombs

. . . Seamless tubing is nosed down hot to form the main body and tailpieces which are then arc welded after being machined individually. Several contractors do parts of this job and all of them improvised existing equipment to get under way fast.

o o o

By J. B. NEALEY
Ordnance Department, U. S. Army

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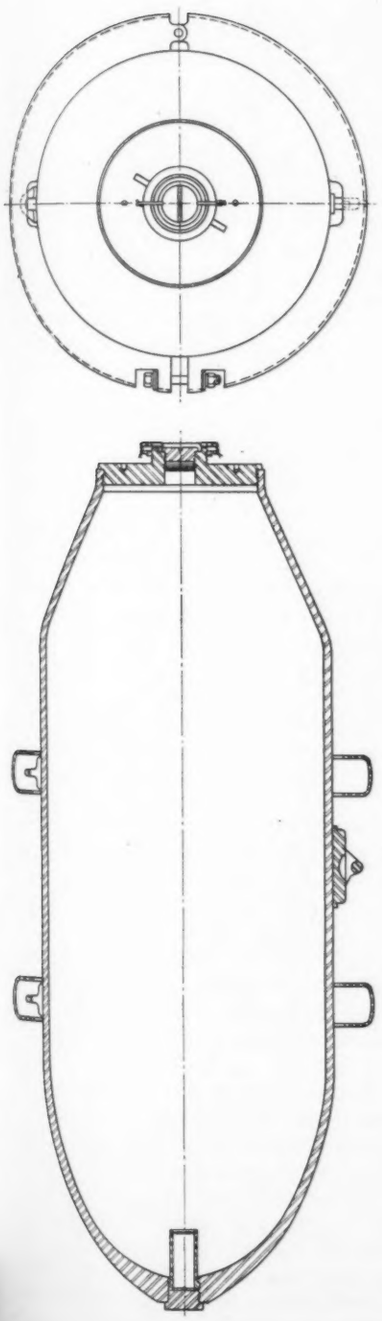

FIG. 1—Sectional view of 1000-lb. aerial bomb.

THE present war is the first one in which bombs dropped from airplanes have become a major factor. The tonnage of bombs used is so colossal as to strain the available facilities for making them, great as these facilities are. To meet the demand, bombs are being made in every way possible, so long as they meet the rigid requirements of the Ordnance Department of the U. S. Army which is responsible for their design, manufacture, procurement and maintenance. High explosive bombs are divided generally into two classifications, demolition (or general purpose) and fragmentation. Both contain a high explosive filler, either TNT or amatol. Fragmentation bombs, generally speaking, are relatively small, with the wall sections specially designed for effective fragmentation. Information on the sizes of this type of bomb, which is used primarily against personnel, is restricted.

Demolition bombs range in size from 100 to 4000 lb. As a maximum charge of explosive is desired, the steel body is made as light as is consistent with the strength necessary to withstand impact stresses. Usually the explosive charge is about half the total weight of the bomb. The explosives used are so insensitive that they will not detonate upon striking or during penetration, therefore more sensitive detonators and boosters are added to make them explode. Fuzes are put in the nose and tail to control the time of detonation and fins are added to the tail to insure their dropping nose down.

Equipment Rebuilt

One method of bomb production, for the 1000 lb. size, Fig 1, starts with seamless tubing or pipe of low alloy steel as the raw material. From this the nose and tail ends are hot formed, machined and then welded together. At one plant (which formerly built 40 freight cars a day), a portion of its space has been tooled for bomb manufacture in the manner described above. The building used is some 1500 ft. long and the bays are served with 5 and 10-ton overhead electric cranes. Starting late in the war program, this company found it practically impossible to obtain when needed the necessary machinery, furnaces, conveyors, etc., so it redesigned and rebuilt 30 and 40-year-old presses and bulldozers it had on hand, purchased even older ones, and extended their life expectancy also. Redesign was necessary because they were originally built for entirely different work. They were of the hydraulic type and it was necessary, among other things, to lengthen the columns. The bomb metal

FIG. 2—Type of gas cutting fixture originally used. Later these were replaced by machines similar to the one shown in Fig. 6.

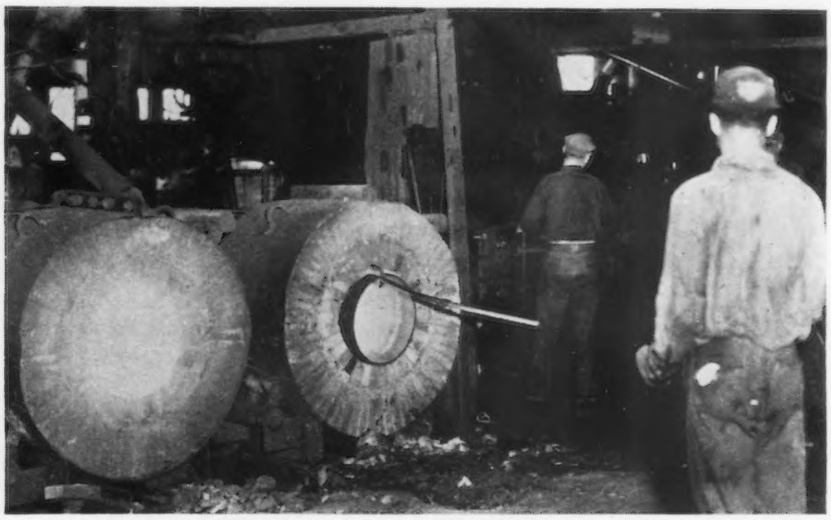

FIG. 3—Circular furnaces especially built for heating the bomb noses.

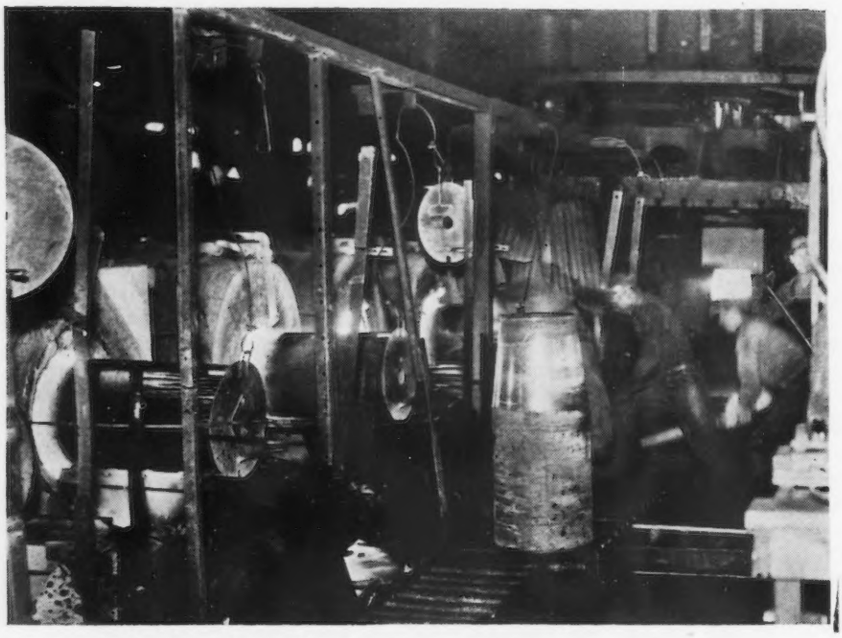

FIG. 4—Partially formed bomb bodies being handled in and out of the furnaces with the aid of tip-up rigs and roller conveyors.

was so hard that it soon chewed holes in the bolster plates and it was necessary to obtain scrap armor plate and make filler blocks for the bombs to be dropped on. The amount of work required was prodigious.

Hydraulic pumps were rebored and redesigned for increased capacity and working pressure which in turn made necessary the addition of modern, high pressure lubricating systems, reinforcement, etc. Hydraulic accumulators were rebuilt to step up pressures from 600 to 1000 lb. per sq. in. This was accomplished by reboring to larger dimensions and increasing the weight and size of the ram. This latter was done by casting 76 tons of special pie-shaped weights, fitting them around the ram and bolting them to it. Regular press makers needed 12 months to do this, along with their previous commitments. This company, by working its engineering staff 18 hours a day, seven days a week, did it in three months. Furthermore, it designed, redesigned, experimented with and built its own furnaces, hundreds of them. It constructed its own roller conveyors. And then, when everything was ready and production started, the company ran slam-bang into metallurgical difficulties that took guts and sweat to lick.

A single production line here consists of the furnaces and presses for the nose and furnaces and presses for the tail. At the start of the line is the cutting department. Random lengths of pipe 15 to 50 ft. long, and approximately 20 in. in dia. enter the plant on flat cars and these are transferred by cranes to a series of cutting tables. These tables were made by bending and shaping car plate to form angles, etc., and welding them to side rails, legs and cross bars and fitting rollers in between. Cutting is done with torches using cheap city gas instead of expensive acetylene. The cost of gas is insignificant and its use requires only 10 per cent more oxygen. In addition, city gas leaves a much softer surface, resulting in a reduction in subsequent machining time.

At first, cutting fixtures were used consisting of a circular or ring gear track which clamped around the pipe. The torch, fixed to a pinion gear meshing with a ring gear was moved around the pipe while cutting by turning a small handwheel, Fig. 2. Grief was immediate and persistent. Tube rolling mill tolerances were naturally beyond the tolerances permitted by bomb design. Unevenness in the tubes caused uneven cutting for it was necessary that both ends of tube length be absolutely square and parallel to each other as this determined whether

they set squarely on the platen of the press or at an angle. Any such defection, together with uneven cuts, caused buckling and folding when drawn hot in the dies.

Gas Cutter Built

This requirement made it necessary to design and build a cutting machine that would cut evenly, squarely and parallel. This unit comprises a long horizontal table or fixture holding a series of rollers so that the pipe can be pushed along its length. At one end is a motor driven chuck to turn the pipe and at intervals along its length are offset pairs of small wheels mounted on air lifts. When the pipe has been pushed into position, these wheels are elevated and the work is given a complete turn. The torch is stationary. This assures square and parallel cuts. To make the cut even, a small wheel is attached to the tip end of the torch and this wheel rides on the pipe while the flame cuts. Regardless of unevenness in the pipe itself, the tip is always held at the same distance from the pipe which prevents any variation in width of cut.

Hot pressing these lengths of pipe to shape is a ticklish proposition and the heats, shape of dies, time and length of strokes, amount of draw to each die, and the rest of the program developed here were the outcome of considerable research, and trial and error. The problems were finally solved and without resort to male dies. The first difficulty was the unevenness of the pipe itself, which led to distortion in the press unless considerable care was exercised. Then again, the temperature had to be right, for if the material was too hot, it would buckle or fold, or both. At first it was thought necessary to obtain a sharp division between hot and cold metal, so the furnaces were constructed with the circular openings just large enough to allow the pipe to enter and cooling water rings surrounded the pipe on the outside. This proved satisfactory on the first operations, but in later stages a definite ridge appeared on the inside contour of the ogive (nose curve). To cure this, the noses were pulled out of the furnaces slightly or just enough to let the flames lick along the sides of the metal and thus produce a gradual heat. Temperatures used range from 1700 to 2200 deg. F.

Special Furnaces Designed

There are from 12 to 20 furnaces to a press depending upon the type of operation and the heat required. These furnaces are circular in shape, about 4 ft. in diameter and 30 in.

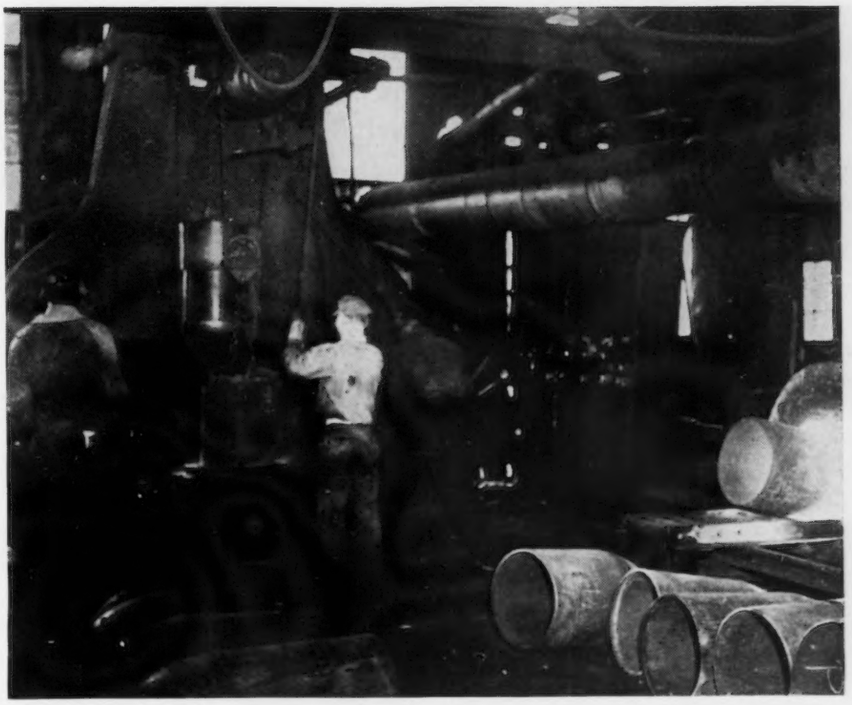

FIG. 5—The final forming operation on the nose is performed in a pneumatic drop hammer, using a male punch. Up to this point, only female dies are used for nose forming.

FIG. 6—Scarfing the tailpiece of the bomb prior to welding to the body. The work is rotated on trunnions under the fixed torch. A similar set-up is now used for gas cutting the seamless tubing.

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FIG. 8—Boring the nose of the tailpiece in a vertical turret lathe.

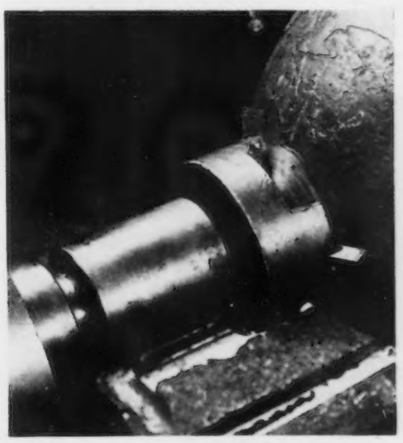

FIG. 7—Hollow milling operation on nose of bomb.

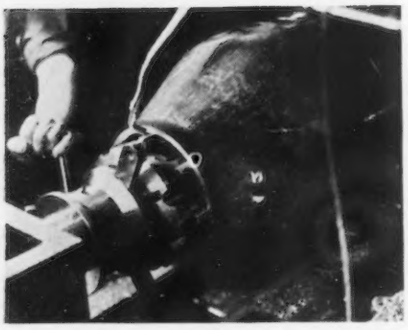

FIG. 9—Threading operation on the tail, using a collapsing die head.

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deep, Fig. 3. Constructed of fire brick laid in a circular steel shell, each is fired by four gas burners and has a vertical vent built onto the back for the escape of the products of combustion. Air is supplied at 14 oz. pressure and the gas pressure is cut to 2 lb. at each furnace by a diaphragm regulator. Roller conveyors are laid on the floor in front of the furnaces and the pipe lengths are pushed along on these. In front of each furnace is a tip-up rig on which the pipe is tipped horizontally so that the end can be pushed into the furnace, Fig. 4. The outer end of the pipe is covered with a steel plate to prevent the escape of heat through the center.

The first operation is in a 1000-ton vertical, hydraulic press with three hydraulic cylinders and three lifting jacks as pull backs. The female die is attached to the upper platen and there is nothing on the lower platen except a gage by which to locate the work. This press forms the end of the pipe into a truncated cone, bringing the approximately 20 in. diameter pipe down to 14½ in. nose opening in this first operation. By this time, so much heat has run into the unworked portion of the pipe that an immediate reheat would so soften the body as to cause it to buckle or fold in the next operation. Therefore, it is allowed to cool and a cooling floor of parallel roller conveyors is provided for the ebb and flow of material at this point.

The next operation is an upset in a 700-ton press of the same type as already described. After reheating the small end of the pipe, the metal here is thickened at this point from ⅞ to 1⅛ in. (according to the variation in the wall thickness of the pipe) by pushing down the hot rim about 1¼ in. The second, third, fourth and fifth draws are formed in quick succession, all with a reheat but without cooling in between. The same type presses and furnaces are employed and the nose opening is brought down to 9¼, 5¼, 3¾, and 3 in. respectively. The nose contour is next formed on a reheat and in the same type press. The last forming operation, if required, is accomplished with a 2500-lb. drop hammer, Fig. 5, on the last reheat. This is the only forming operation where resort is had to a mandrel or male die. By means of a hydraulic ram, the bottom or female die is pushed clear of the hammer for

FIG. 10—Fixture used to tack weld the two parts of the bomb together.

o o o

loading and the bomb is dropped into it nose first, after which it is pulled into position under the hammer. The ram then forces the male die down into it.

Operations on Tailpiece

The first operation on the tail piece is to hot forge one end to a truncated cone shape, with a diameter opening of 13½ in., in a 300-ton bulldozer. A second operation, on another bulldozer, brings the end down to 10⅝ in. in diameter and a final forming is accomplished in a third bulldozer for sizing. The work is heated or reheated for each of these operations and no cooling is necessary in between. The female die is used in the first two operations, but both male and female dies are employed in the third. Both halves of this bomb are checked with a ring gage allowing 1/16 in. tolerance. The two ends to be matched for welding are then beveled or scarfed at a 30-deg. angle. This is done with the same type gas torches, Fig. 6, as were employed in cutting.

Trucked to another plant with available machining capacity, the nose half is put on an engine lathe were it is supported in a steadyrest and is rotated by means of a special faceplate to which it is attached. Tools mounted on a turret then drill the lead hole; first and second bore the fuze hole; face end; face; contour tip of nose, Fig. 7, and finally thread the fuze hole with a collapsible tap. The tail end is put in a vertical turret lathe and the end faced to length, Fig. 8. The hole is threaded with a collapsible tap, Fig. 9, while the nose is held in a pneumatic chuck.

The halves are then shipped to a third plant with a large furnace capacity that could be used for annealing. It happens to be a sanitary ware manufacturing plant with a large number of vitreous enameling furnaces for products as large as bath tubs. An immense welding shop has been set up and also a welding school. Here the halves are welded together into complete bombs. Electric welding is employed. Due to the non-uniformity in the wall thickness resulting from the tolerances on seamless tubing, the two sections of the bomb are matched for thickness before welding.

Arc Welding Operations

Next, the tail portion is put into an upright fixture, Fig. 10, the nose section set on top and the two halves are tack welded together. The metal at this joint is then preheated to something like 600 deg. F. This is accomplished by rotating the tacked bomb on a fixture equipped with a motor and pushing twin gas and air torches in through the open (rear) end so that their flames will play on the metal. Welding is performed on similar fixtures with four rollers turn-

FIG. 11—Completion of the welding is performed in this rotating fixture. Three beads are laid down.

ed by motors, Fig. 11. The bombs are rotated slowly—at welding speed —one revolution every 6 min. Three beads are laid and the flux is chipped off each pass with pneumatic chisels. Grinders and chisels are used to smooth up the completed weld, which is allowed to protrude no more than 1/16 in. above the surface on the outside and ⅛ in. on the inside. Lugs are also welded on for handling the bombs in the field and in the planes.

Welds must be of uniform size, width, smoothness and reinforcement. Cracks of any nature or extent in weld metal or plate is cause for rejection. Surface defects such as pock marks, gas pipes, slag pockets or other surface irregularities are not acceptable by Ordnance inspectors. Also welded surfaces should merge smoothly into the plate and undercuts and rolled or lapped edges of welds are not permitted. It is further specified that offsets at the welded joint shall not exceed 0.06 in. Rigid radiographic examination is made of the welded seam of one out of every ten bombs made as a further check on the quality of the welds.

The bombs are then normalized at 1600 deg. F. for an hour in semi-muffle, gas fired furnaces. These furnaces are about 15 ft. wide and 8 ft. deep. Heat is supplied by three natural gas burners on each side firing in the space below the hearth with the hot products of combustion passing up around the muffle. The bombs are lifted in and out of the furnace on a longhandled fork suspended from a chain, Fig. 12. The furnace doors are opened and closed electrically by push buttons located in the handle of the fork. The bombs, while being heated, rest on bucks which in turn rest on the hearth. During heating, the threads on the bombs are protected by a protecting plug screwed into the nose and a protecting rig screwed into the tail.

Each bomb is tested hydrostatically for 1 min. and the welds observed for porosity and strength. The lugs are tested to 8000 lb. with a hydraulic jack. Shot blasting inside and out is now resorted to and the setup for the first includes roller tables and a series of booths. The bombs are rolled in front of apertures in the booths, tail first, and a shot blast nozzle on a track inside the booth, moves slowly forward into the bomb, blasting as it progresses. The bombs are then loaded into fixtures suspended from an overhead chain conveyer, Fig. 13, and are moved through one large booth some 30 ft. long and 10 ft. high. Here a series of rotary blasts clean the outside.

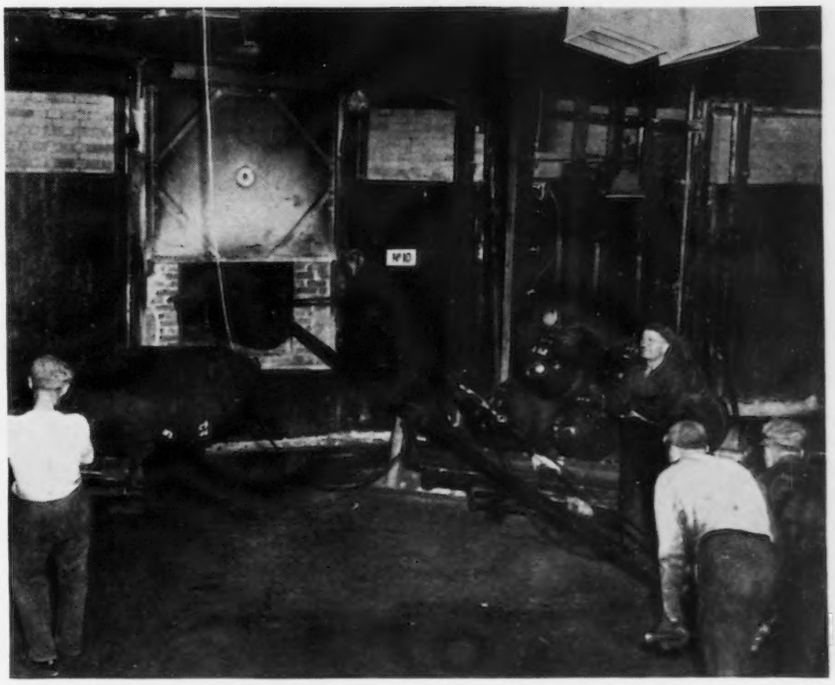

FIG. 12—Handling bombs in and out of the annealing furnace. Push button control for the furnace door is in the handle of the long fork.

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Fig. 13—Loading bombs on the sand blasting conveyor.

ABOVE

FIG. 15—Final inspection follows the placing on of the lug protecting rings.

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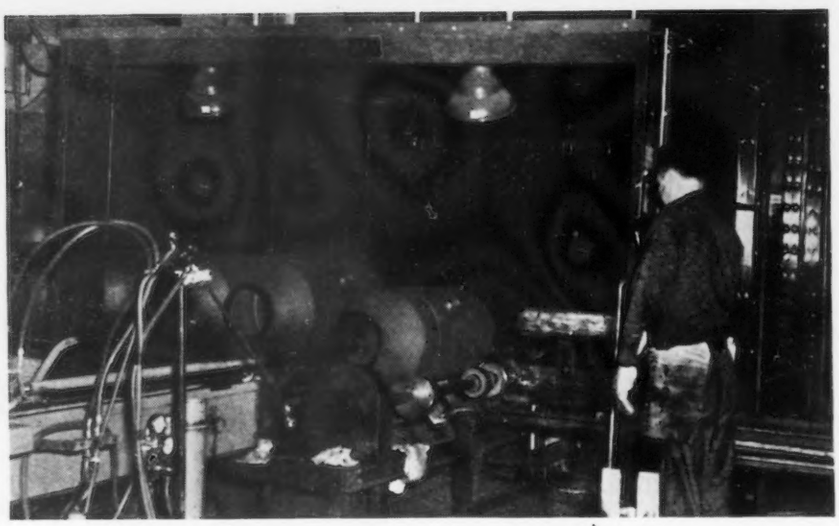

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FIG. 14—Spray painting the interior of the bombs is done automatically with this equipment. The spray gun lance is traversed into and out of the work by power.

Spray painting is next in order and a booth with water curtain in back is employed. The bomb is rotated on a motor driven fixture and an operator with a hand spray covers the inside weld to give it an extra coat. Then a long spray nozzle on a short, motor driven closed loop chain is moved slowly forward, spraying the entire inside surface, Fig. 14. The threads are still protected. An overhead closed loop chain conveyer now carries the bombs through another booth where an operator sprays the outside. This conveyer is some 25 ft. long to provide a drying period. To hasten the drying of the interior coat, blasts of air are forced up into the open ends of the bombs as they pass along. The shipping bands, to protect the lugs, are put on after drying, Fig. 15.

In transferring the bombs from one operation to another, or from one type of conveyer or fixture to another, swing post cranes with electric hoists are used. The temporary nose plug has a ring in it and this, together with the lugs, greatly facilitate handling. The last operation, performed on a roller table, is to replace the ring in the tail with the tail plug and the bombs are loaded from there directly into box cars for shipment.

▼ ▼ ▼

Pure Gases Needed for Welding Aircraft Steels

IT makes absolutely no difference in the fissure-formation tendency of either unalloyed or alloyed aircraft steels whether the acetylene used for welding is drawn from cylinders or direct from generators, according to investigations of the effects of impurities in welding gases on the tendency to crack formation of welded chromium-molybdenum aircraft steels, reported by J. Muller in *Autogene Metallbearbeitung.*

Other conclusions arrived at in these studies were: The amount of sulphur and phosphorus bearing impurities normally present in welding gases is so small as to have no measurable effect on the fissure-formation tendency; all the same, it is advisable to use gases which are as pure as possible. The presence of between 0.03 per cent and 0.8 per cent of hydrogen sulphide has no effect, but 0.9 per cent and upwards has a very detrimental effect. The presence of 0.1 to 0.12 per cent of phosphine in the welding gases does not affect the fissure-formation tendency. Phosphine and H_2S in excess of 0.8 per cent have a very detrimental effect.

Are Sharp Cutting Edges Necessary on Rough Cuts?

. . . The author expresses the view, shared by an increasingly large number of shop men, that stoning off the edge of roughing tools actually increases the life between grinds.

By LEO J. ST. CLAIR

President, General Tool & Die Co.

THE answer is "no" to the question "are sharp cutting edges necessary on roughing cuts?" I have run across countless cases of failures of roughing tools that were corrected by simply dubbing or stoning off the cutting edge of a tool. Many operators felt that when I stoned off the cutting edge of the tool, the tool wouldn't cut, but were much surprised to see that this stoning off of the edge didn't interfere with the cutting edge of the tool.

Fig. 1 shows the method of stoning off the edge. Hold the stone or hone at 30 to 45 deg. to the edge and stone off a land that can be from 15 to 25 per cent of the feed per rev. If feed is 0.060 in., you can stone a land 0.009 to 0.015 wide without interfering with the cutting action of the tool.

I believe the reason why most persons are reluctant to do this is because we call a tool taking a roughing cut a "cutting tool." This heavy metal removal is not correctly interpreted. When taking a roughing cut the tool becomes a "wedging tool" as shown in Fig. 2. The metal is wedged off from the work forming a little triangular section which is filled with metal from the work called the "built-up edge." The cutting edge itself serves no useful function on rough cuts and when it is left sharp, several things can happen that may cause early failure of the tool.

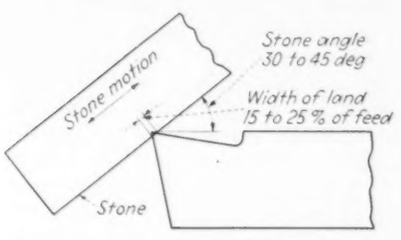

FIG. 1 — Method of stoning off the sharp edge of a lathe roughing tool.

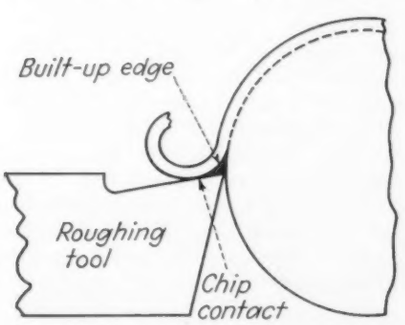

FIG. 2—The presence of the "built-up" edge gives the roughing tool a wedge action rather than a cutting action. The chip impinges on the tool an appreciable distance from the cutting edge.

If the metal being removed was absolutely uniform as to hardness we would not experience trouble. But we know we have hard inclusions to contend with. We also know that when very hard metal is encountered, it does not "wedge" off like soft metal. This hard inclusion therefore must touch the sharp cutting edge and then this hard inclusion is compressed out of the way. In the meantime the hard inclusion will break out a section of the cutting edge resulting in minute chipping. This action is repeated and in time the original sharp cutting edge becomes a series of broken out sections resulting in a bad loss of clearance and failure of the tool. This is shown in Fig. 3.

There may also be chipping due to the intermittent displacement of the built-up edge. This metal is welded to the cutting edge area like smear metal and when it is displaced, it is probable that it picks off small pieces of the cutting edge also.

By stoning off the edge, you greatly increase the strength of the cutting edge area, as shown in Fig. 4. You can easily appreciate the great increase in strength of the cutting edge area caused by stoning the sharp edge off. Then when hard inclusions touch this area, they are compressed into the softer metal and are carried away without breaking out the hard cutting tool material. I also believe that when the built-up edge is displaced, the chances of having the hard cutting tool material "picked" out is greatly reduced.

The importance of stoning off the edge of cutting tools on roughing cuts increases with the non-ferrous cast alloy tools such as Stellite, Rexalloy, Speedaloy and Kutkost and also on all cemented carbide tools because the edge strength of such tools is not as great as with high speed steel tools.

I have already found out that some H.S.S. tools hardened to 65 to 66 Rockwell "C" fail due to excessive chipping on a roughing cut unless the edge is stoned off. Many persons believe the only recourse is to have such a tool made with a Rockwell of 60-62 C. This means a shorter life due to a softer tool. By stoning off the original tool edge, a harder, more abrasive resistant tool can be used and much greater life between grinds can be secured.

The stoning off of the cutting edge is of great importance on rough interrupted cuts also.

FIG. 3 — When hard spots displace bits of the built-up edge, they remove minute chips from the sharp cutting edge, as shown in exaggerated form in this enlarged view.

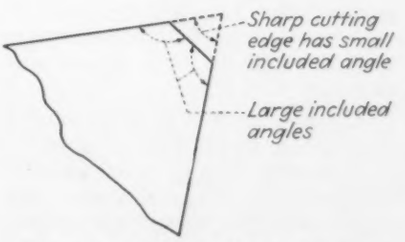

FIG. 4—By dubbing off the edge of a roughing tool, the included angle at the new edges becomes much greater, thus strengthening the tool.

Electric Arc Hot Topping

o o o

By GEORGE F. SULLIVAN

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The use of feeding heads or hot tops on ingots and castings is a palliative that makes it possible to obtain a certain amount of sound metal at the cost of scrapping from 15 to 35 per cent in cropping. Application of an electric arc to the ingot hot top offers a possible means of increasing net output and reducing cost, particularly on alloy steels.

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IN these days of critical materials, every method which might further the war effort by saving time and materials is being exploited to the utmost. One such method which was developed many years ago by the Huntington works of the International Nickel Co., Inc., has been receiving considerable attention lately.

Electric arc heating of ingot feeding heads or hot tops was developed by International Nickel at Huntington, W. Va., several years prior to 1924 and practical application started in 1924. With minor modifications, all of which have tended to speed up operations, the company is still using the process today.

Meanwhile, this technique has been successfully applied in the United States to the casting of alloy steel rolls and is in regular use by a plant in the Pittsburgh area especially. It has also been used successfully for some years in Austria, Germany, Belgium, France and England on both ingots and castings.

Express purpose of applying the electric arc to the hot top is to retard cooling in this area, thereby eliminating or minimizing top shrinkage due to piping as the metal freezes.

Results indicate that this method increases the percentage of good metal obtained in the ingot which represents an increase in production since the time lost in reworking the scrap is eliminated. In the case of International Nickel it has been found that the use of the electric arc on ingot feeding heads has, in the last analysis, given them five ingots of metal out of a given heat where previously four were obtained.

Certain minor difficulties, for the time being, tend to prevent the application of this process to the ingots of a standard steel heat but its ability to decrease piping as well as carbon and sulphur segregation should be important on heavy ingots and castings where large sink-heads are necessary. It is probable also that the process can be adapted to special alloy steels where the savings in the metal, as well as the subsequent handling of the ingots outweigh the detail and necessary costs for installing such a process.

Non-Ferrous Practice

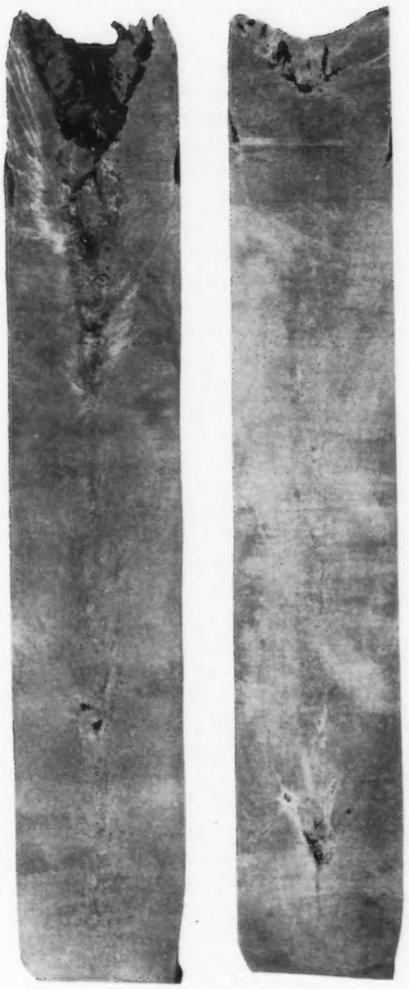
At International Nickel's Huntington plant ingots of Monel metal, nickel, or other high nickel iron alloys are poured in a pit, big end up, at an average temperature of 2750 deg. F. An 1800 kva. transformer supplies current to six or more electrode trucks which serve the various ingots. These trucks, which are moved around to the ingot being poured, support an electrode which is adjusted over the ingot top. The electrode truck is connected to a bus bar located in the trough near the pouring pit; the current returns through a steel wedge driven between the ingot mold and a live steel rail running around the edge of the pit.

While single electric arcing units are used on most ingots, very large ingots are taken care of by using more than one unit. The company has used as many as three on some of their larger jobs.

Typical of the technique is the pouring of a 7200-lb. nickel ingot into an 18½x68-in. mold, from a small open hearth furnace tapped at 2900 deg. F. The ingot hot top, made of ganister and clay, is about 12 in. deep. The ingot is poured through a 1-in. nozzle and the mold filled quite slowly until there is about 6 in. of metal in the hot top. A slag consisting of glass and lime is then thrown on the metal in the hot top and its cover placed in position. The truck bearing the electrode with its regulating mechanism is wheeled up and set in position so that the electrode is centered over the hole in the hot top cover.

The power is turned on and the electrode lowered until it contacts the slag, after which the arc is maintained automatically. Current input during the melting down period is about 3000 amp. at 115 volts and the time required to melt the slag is about 8 min. When this is molten the power is reduced to about 200 amp. and held on for approximately 7 min. After shutting off the power, the electrode is removed and the top closed to conserve heat.

Sometimes the amount of metal left in the ingot hot top is only 2 or 2½ in. Even this small amount of hot top usually contains a good deal of usable metal. The use of



ABOVE

FIG. 1—13-in. square blooms from same heat, showing on the left an untreated and on the right a treated bloom.

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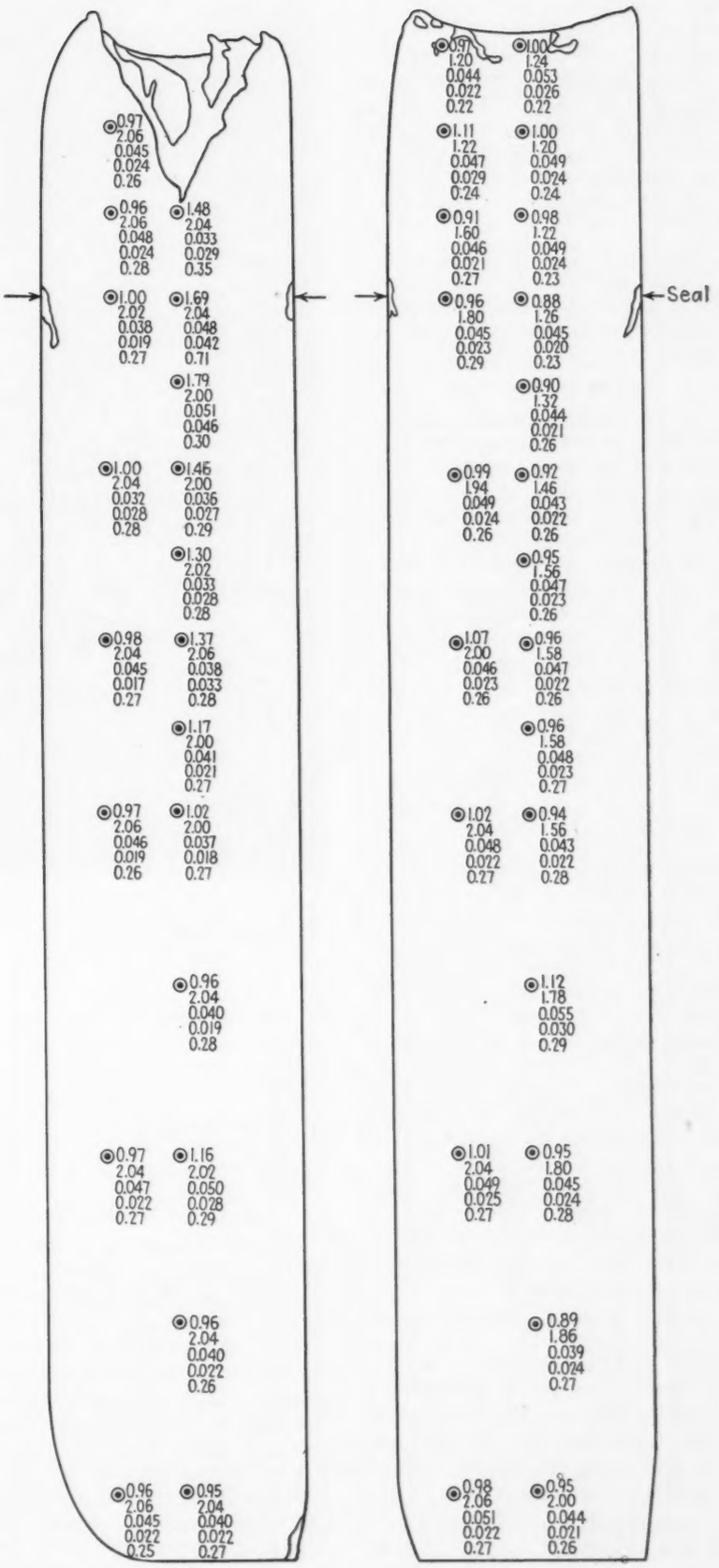
FIG. 2—The 13-in. square blooms of Fig. 1, indicating here the analyses at various points.



electrically heated hot tops has cut crop loss in this plant from 30 to 35 per cent down to 8 or 10 per cent.

Electrode consumption is in the neighborhood of 6 to 8 oz. per ton. A 3-in. graphite electrode is used for 3300-lb. ingots and a 4-in. one for the 7200-lb. ingots.

The metals on which the hot top process is used by International Nickel freeze without marked segregation since they are either the practically pure metal, nickel, or the solid solution alloy, Monel. Unfortunately, killed steels do not solidify without segregation. Instead, the last metal to freeze is very much enriched in carbon and the ingot must

be cropped, not only to remove the pipe which is reduced by use of the hot top, but also to remove the segregated portion. Complete avoidance of piping by use of the arc would not eliminate the necessity of cropping slightly to remove the segregate. This segregation is fully discussed in several reports of the Committee on Heterogeneity of Steel Ingots of the British Iron & Steel Institute, and given in that institute's *Journal*.*

* *1926, No. 1, pp. 39-151; 1928 No. 1, pp. 401-545; 1929, No. 1 pp. 305-376. Also the separately printed 4th report of 1932, 267 pages.*

Successful in Europe

Reports from Europe indicate that this process has been put into successful operation in steel mills. A paper presented in Paris in 1935‡ states that it has been used on 100-ton forging ingots as well as on castings and on 200-lb. tool steel ingots. The author claims that piping is completely eliminated and segregation noticeably diminished. The quality of the metal is improved, he adds, due to the tranquil fusion of the steel and the action of the arc and the flux. The type of flux used is not given.

‡ *M. Leopold Granger*, Revue de Metallurgie, 33 *No. 4, 1936, page 243.*

The Schoeller-Bleckmann Steel Works, Ternits, Austria, has successfully applied the electric hot top to forging ingots ranging in size from 10 to 50 tons. According to a rather complete report prepared by an engineer at this plant, good results can be obtained if certain conditions are observed. These results, based on a typical ingot, show a carbon increase of only 0.05 per cent in the upper central portion of the ingot head, elimination of piping and no segregation of manganese or silicon. Sulphur content was up by 0.010 in the center of the ingot head but phosphorus was practically unchanged.

Careful tests on the portion of the ingot below the ingot head showed it to be practically free of the well known V-segregation. Along the edges small remainders of the L-segregation remained, but they give no trouble in the further working of the steel.

These results are apparently better than anything secured in this country on steel ingots, but they demand the maintenance of a set of specified conditions, the most important of which is that ingot diameter shall be equal to half its length. Other requirements, not difficult to control, include careful regulation of the heating time and of the period after heating before removal of the ingot from the mold.

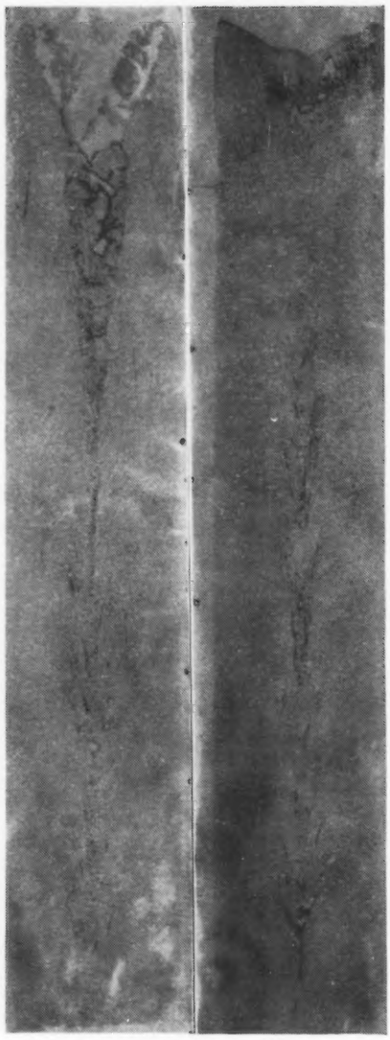


FIG. 3—Etch tests and sulphur points from the 13-in. square blooms, untreated and treated.

Current Consumption

Schoeller-Bleckmann uses three graphite electrodes which are consumed at the comparatively high rate of 3 to 4 lb. per ton of ingot. Current consumption is between 30 and 40 kw-hr. per ton of ingot. This compares with a French figure of less than 20 kw-hr. per ton of ingot and less than 30 kw-hr. for each ton of casting treated. Steel ingots have been treated in this country with a current consumption of less than 15 kw-hr. per ton of ingot, though at International Nickel the figure is closer to 30 kw-hr.

Some years ago the Electrode Division of the National Carbon Co., Inc., in cooperation with the Union Carbide & Carbon Research Laboratories began a series of experiments to determine the possibilities of applying electric arc hot tops to steel ingots.

The equipment available limited the application of the process to 8-in. sq. ingots. Graphite electrodes ¾ in. diameter were used on three treatments and 1 in. on the others. Lime-silica-magnesia and preformed silica lime slags were used. The electrode consumption was at the rate of 8 oz. per ton of ingot and the power consumption 14 kw-hr. per ton of ingot. On account of the small amount of electrode consumed in the arc the treatment was practically self-regulatory once the slag bath was melted on top of the ingot. The current was reduced from 1000 to about 200 amp. once the slag bath was molten.

In the case of low-carbon, low-alloy steels it was possible to work the entire ingot without cropping on account of splitting. With stainless steels the flat upper surface of the ingot opened slightly during forging, but the amount of cropping necessary to remove the split portion was less than 5 per cent.

Mill Tests

The results of these tests were so encouraging that it was decided to give the process a mill test on larger ingots at the plant of an Eastern steel producer.

Ingots from several heats were treated (using standard clay hot tops) and compared with standard ingots. One of these was a 1 per cent carbon-manganese-molybdenum steel, cast in a 24-in. round corrugated surface ingot mold with the big end up. The ingot weighed about 8000 lb. and the hot top was approximately 20 in. in diameter. The slag consisted of 25 lb. of a mixture of two parts silica and one part lime. In this case the surface of the steel had frozen before the power was applied due to a blown fuse. Sounding tests showed that the steel was molten to the bottom of the hot top when the current was turned off, which was 1 hr. and 20 min. after pouring. At 1 hr. and 50 min. all metal in the hot top had frozen, and the slag froze at the end of 2 hr. and 5 min. When this ingot was stripped and the hot top cleaned off, the surface was found to be perfectly flat.

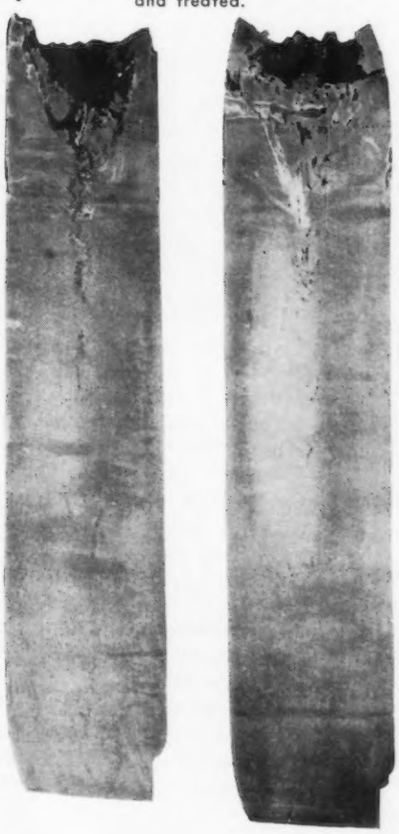
This ingot and an untreated ingot from the same heat were rolled

down to 13-in. sq. blooms. Fig. 1 shows the manner in which the blooms were sectioned, and Fig. 2 indicates the analysis at various points, secured by borings. The etch tests and sulphur points illustrated in Fig. 3 represent the top 40 per cent of the ingots after rolling to blooms.

All the metal below the hot top in the electrically heated ingot was sound and more solid than the metal at the middle of the length of the bloom. The comparison ingot showed blowholes for a length of more than a foot below the bottom of the hot top. It will be noted that there was no deep piping or sulphur segregation in the treated ingot. Some midway segregation appears in this ingot, but the center checks are fairly uniform. There was, however, a considerable loss of manganese. Sulphur and silicon analyses are uniform but there was a little more phosphorus segregation than was found in the standard ingot.

Another heat that was treated by the electric arc method was a 1.4 per cent carbon-manganese-molybdenum steel. The mold in this case was rectangular, measuring 18 x 21 in. The lateral dimensions of the hot top were approximately 14 x 17 in. The same slag was used as before. Treatment was started immediately after pouring and continued for 1 hr. The mold top remained open and the electrode was moved over the surface. Settling of the surface was uniform and without piping.

FIG. 4—13-in. square blooms, untreated and treated.

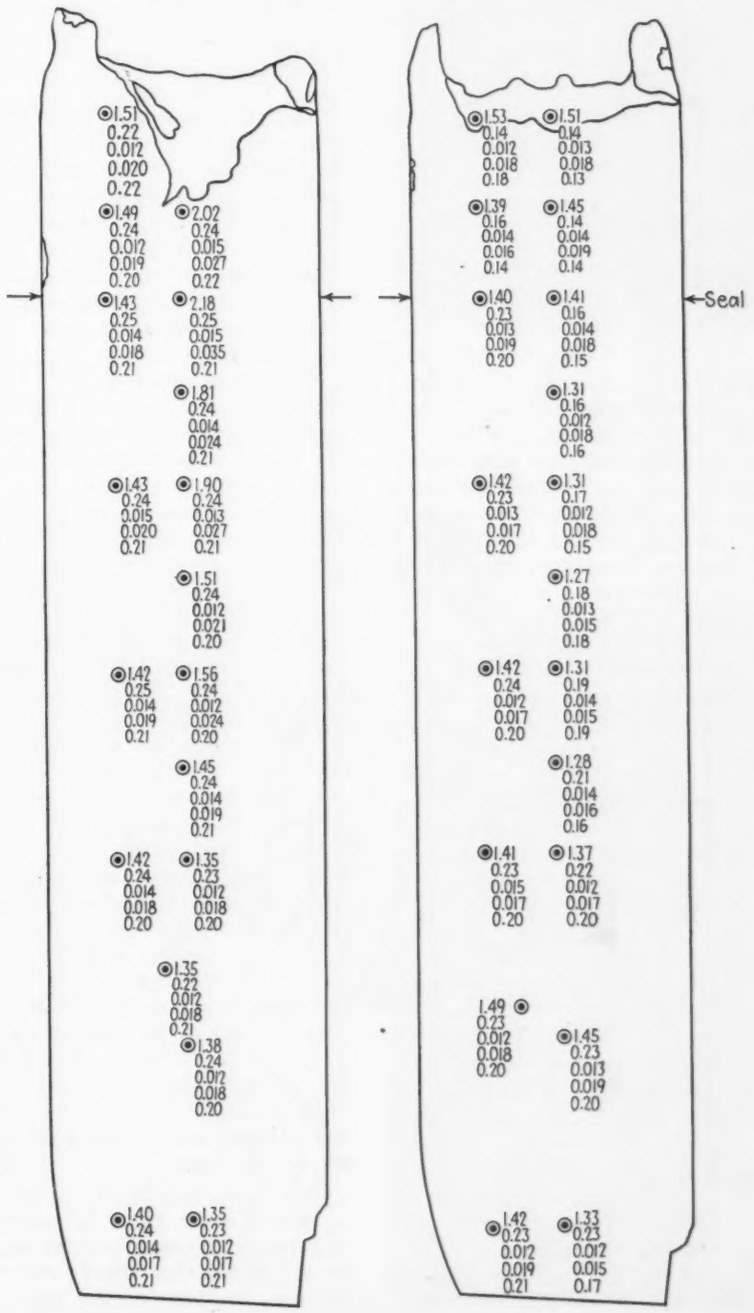


Treated and standard ingots from this heat were also rolled to 13-in. sq. blooms. These sections are pictured in Fig. 4 and their analyses in Fig. 5.

The heating was not as effective on this ingot. The pipe extends down into the ingot, though not quite as far as on the standard ingot. The sulphur prints, Fig. 6, and analyses indicate a much better sulphur distribution in the treated ingot. Some negative carbon segregation is present at the top of the treated ingot as compared to heavy positive segregation in the standard ingot. Here again there was a considerable loss of manganese as well as a substantial silicon loss. Phosphorus checks show no difference between the two ingots.

The results of these tests were satisfactory in every way except for the negative segregation of carbon, manganese and silicon in the upper third of the ingots. This

FIG. 5—Analyses in the 13-in. square blooms untreated and treated.



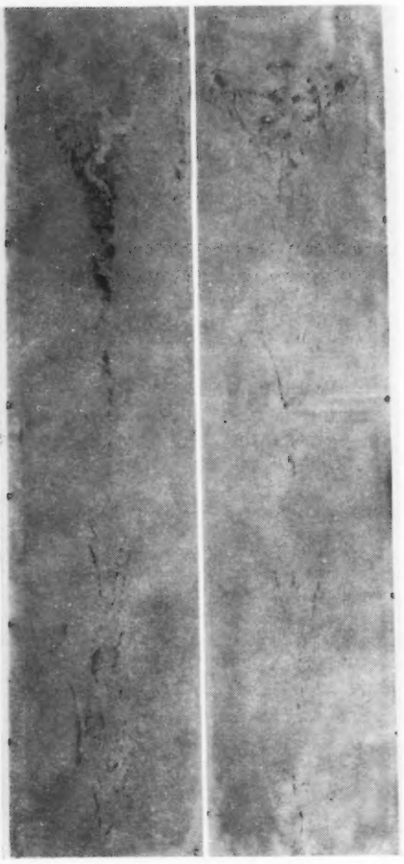


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FIG. 6—Sulphur prints from 13-in. square blooms.

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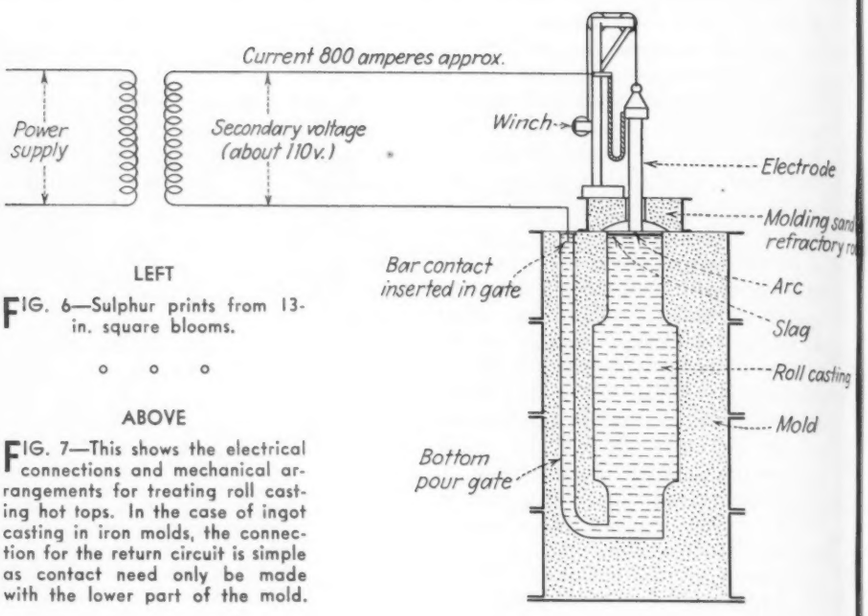

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FIG. 7—This shows the electrical connections and mechanical arrangements for treating roll casting hot tops. In the case of ingot casting in iron molds, the connection for the return circuit is simple as contact need only be made with the lower part of the mold.

was due to the siliceous slag used in the treatment and can be avoided by the necessary adjustment. It was not expected that this would cause trouble, for the early experiments were directed at determining electrode size, current requirements and heating times necessary to reduce or eliminate top shrinkage due to piping.

Treatment of Rolls

In the application of the electric arc heating to large roll castings, the conditions are especially favorable, since the castings are large, the number of treating equipment units is small, and the castings are made in dry sand molds which provide fairly good heat insulation around the risers so that the power required is low. The treatment period required, however, is long in comparison with chill-cast ingots, on account of the large mass of metal in the casting and the relatively low rate of heat loss.

The first application for this purpose was made at a foundry near Pittsburgh, whose specialty was the casting of large rolls for rolling mills. In the conventional practice before the installation of the electrode treatment, the weight of the riser was equal to about two-thirds of the weight of the roll. The rolls were cast on end in a circular flask, bottom-poured through a sprue until the level of the metal in the mold was above the roll proper, and the balance of the metal was poured directly into the riser.

When the electrode treatment was applied, a dome-shaped roof of molding sand with a hole in the center for the passage of the electrode, was rammed up in a circular flask and dried in a core oven. As soon as the pouring was finished, a flat iron bar was thrust into the molten metal in the sprue to form one side of the electrical circuit. The necessary slag was then placed on top of the molten steel in the riser, and the dome roof placed on top of the flask. The electrode rigging was set on top of the mold, the electrode lowered through the hole in the roof, and the arc struck and maintained automatically until all the metal in the casting had solidified. (See Fig. 7). The heat supplied was sufficient to maintain molten the entire surface of the metal in the riser, and as the shrinkage of the metal in the casting took place due to solidification, the molten metal from the riser flowed into the casting to replace the shrinkage and the surface of the metal in the riser dropped uniformly. After the casting was entirely solid, the power was turned off and the metal remaining in the riser allowed to solidify, which it did without piping and with a flat top on the riser.

The first tests were made with a normal-sized riser in order to test the performance of the equipment. When this was found satisfactory, the size of the riser was gradually reduced until it was cut to about half of the original volume. It is not certain that this is the maximum possible reduction but the volume of metal has been kept at this point to be absolutely certain that there will be no pipe or unsound metal in the roll casting. This reduction in the volume of the riser has considerably increased the output capacity of the foundry and has also made it possible to cast larger rolls than previously, as the total amount of metal available for a single roll was limited by the capacity of the open-hearth furnaces, and the electrode treatment increased the metal usable in the roll casting from 60 to 75 per cent of the total melting capacity.

As a specific example of the results obtained, a certain roll casting according to normal practice, was 40 in. in diameter by 133 in. long and weighed 47,500 lb., while the riser was 36½ in. in diameter by 60 in. long and weighed 29,800 lb., or 63 per cent of the weight of the roll. By using the electrode treatment the weight of the riser was reduced to 14,800 lb. or 31 per cent of the weight of the roll. This riser was sectioned and about two-thirds of it was perfectly sound steel without any indication of porosity, so that the weight of the riser could have been still further reduced. The power consumption has averaged about 20 kw-hr. per ton of metal poured. Electrode consumption ranges near ½ lb. per ton of metal. The process has now been in use in this foundry for three years, and the average saving in metal has been 4.5 tons per roll casting.

Stripping Lacquer Protects Fine Finishes

A NEW stripping lacquer that prevents scratching, marring and corrosion of polished or easily marred metal surfaces has been developed by the Ault & Wiborg Corp., 75 Varick Street, New York, resulting in valuable man-hours saved and fewer rejected pieces. It is not a permanent finish but is designed to protect highly finished work in process and assembly. Known as Protektol, this coating is a clear, transparent liquid plastic, obtainable in red, blue, green and the familiar yellow-green of zinc chromate primer in a special translucent rust-inhibiting type. A special type is available for plastics. The use of color acts as a guide in adequate film thickness in application, aids identification of various types of stock and insures complete removal of film when desired.

ABOVE

IRREGULAR shaped objects may be coated as easily as flat sheets by spraying a thin layer of Protektol lacquer to provide protection against grease, rust, dirt, and scratches.

Protektol is supplied in liquid form ready for use, but special reducers are available to adjust viscosities to suit variable conditions and equipment. It may be applied by brushing, spraying, dipping or roller-coating. Applied in a normal film thickness and under normal conditions of temperature and humidity, Protektol will dry to touch in less than 5 min., to handle in 15 min. and will strip in 30 min., if desired. A minimum film thickness of 0.001 in. must be used to provide sufficient tensile strength for removal.

In cases where sheets must be stacked shortly after removal from the spray booth, application of a little heat is desirable to prevent solvent trapping and subsequent softness of film and low tensile strength. Hot air from a blower, either in or just outside the spray booth, has been found to yield satisfactorily dry films. Air at 150 deg. F. for 10 or 15 min. or higher temperatures for shorter times is effective. If a bank of infra-red lamps is available, it can be used to materially shorten the drying time. Brushed or roller-coated films, because of the more slowly evaporating solvent employed, require longer drying periods.

Running a knife blade or other sharp object along the edges to break the film at the points where the highest surface tension is developed usually permits removal of Protektol in a single sheet. A faster method of removal is to puncture the film in the center with a pin and apply a jet of high-pressure air to the hole. The film swells up like a balloon, finally breaking and flying off the surface. The balance of the film may then be removed by directing the jet of air underneath the exposed edges and blowing it off.

Drawing or layout work may be done right on the film by using a soft pencil, crayon, or India ink. The markings are removed with the film. A sheet of metal coated with Protektol can be put through die stamping operations, drilling, rolling or any other metal fabricating process without fear of scratching the metal.

Stripped film can be reclaimed by the supplier. If more than one color is being used, the colors should be segregated and baled separately. The type used on metal should not be mixed with the type used on plastics or with the "temporary rust inhibiting primer" type. They are not compatible with each other and require different solvents. Water should be religiously avoided as it will cause the reclaimed Protektol to be cloudy.

A similar product is marketed by the United States Stoneware Co., 60 East 42nd Street, New York, under the trade name, Tygan Tempro-Tec.

ABOVE

THE simplest means of removing Protektol is to lift one edge and peel it off the metal sheet. Running a knife blade or other sharp object along the edges to break the film at the points where the highest surface tension is developed facilitates removal.

RIGHT

ANOTHER method of removing the film is to lift one corner and apply air from a jet.

Teaming Up Carbide Tools

By GAYLORD G. THOMPSON

District Tool Engineer, Vascoloy-Ramet Corp., Houston, Texas

ANYONE associated with or responsible for the control and maintenance of carbide tools knows that there are sources of trouble with carbide tools to the uninitiated. Let us take one little example. A shell manufacturer had several machines set up to finish turn the bourlett. About 0.015 in. stock was left on for the finish turn. A "soap water" or soluble oil, coolant was used. Considerable difficulty was experienced to hold size on repeat pieces. It is a well known fact that carbide tools must have their noses buried in the steel to do good work. Yet on this job where such little stock was to be removed, the use of soap water aggravated the skidding tendency of the carbide tool, that is, to make the tool slide over the work and make it spotty in action and difficult to maintain dimension tolerances on repetitive parts. Soluble oil plays a very important part in the efficient performance of metal cutting tools, provided sufficient material is being removed by the cutting tools to keep them from skidding over the surface. But, with insufficient stock being removed, it is just like trying to plow without the share being set deep enough to turn over the "pay dirt."

Usually, where insufficient stock is left for finish cutting with carbide tools, the best thing to do is to run the work dry. When this was done on the particular job cited, the dimensional tolerances remained so uniform on repetitive parts that production was increased 100 per cent—that is—two lathes did the work of four. The machine operators were enthusiastic and asked "why wasn't this thought of before?"

This is practically an insignificant example wherein no special emphasis is placed on tool performance but Mister, it is just such understandable service as this that takes the "rave" out of the "Super" and makes him warm up to the tool engineer that helps him overcome his carbide tool problems. And just the simple matter of running the work dry was one way of cashing in on good will. The tool used in the finish turning of the bourlett is shown in Fig. 1.

There are many other carbide tooling troubles that can be overcome by changing the design of the tool being used. This might involve the well known negative back rake for run-out work on lathes or for planers or shapers; increasing feeds so as to get chip control with shallower chip breakers ground in the carbide tip; using softer carbide grades to overcome the wedging and splitting action caused by scale on forgings, etc.

But there is one major factor in the attainment of long life for carbide tools that seems to be an "orphan in the storm" so to speak in the general discussion of things and that factor is "Teamwork."

Back in the old days of the machinery industry, carbon steel ruled supreme as the king of the metal cutting tools. That was when a mechanic operating a lathe would start a roughing cut on a shaft and then sit down and "day-dream" about "fishin' or somethin'" for hours before he would again have to move and reset the position of the tool for another cut. Yep—20 to 30 cut-feet per minute. What a laugh that would be today!

Then came high speed steel cutting tools that cut two to four times as fast as carbon tool steels—a production average of 75 to 80 ft. per min. The advent of high speed steel into the industrial domain of metal cutting naturally brought about changes in design in metal cutting

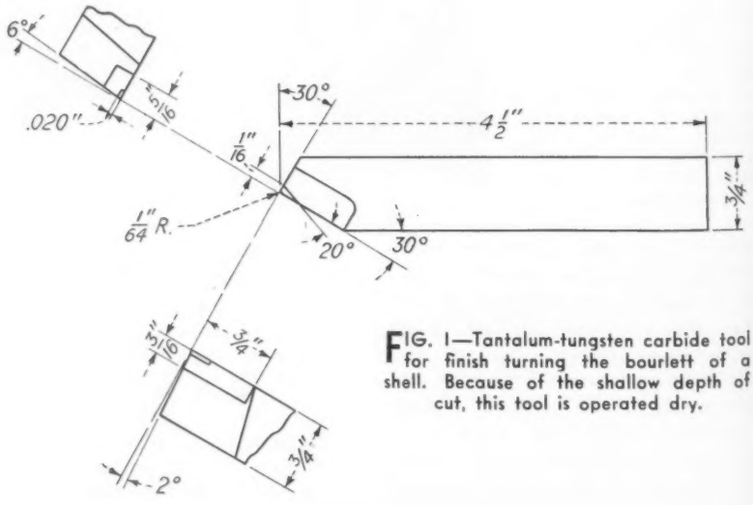


FIG. 1—Tantalum-tungsten carbide tool for finish turning the bourlett of a shell. Because of the shallow depth of cut, this tool is operated dry.

machine tools. Not only was the range of speeds increased but also the power. Although machine tools have now been built for years under the supposition that high speed steel cutting tools would always be used, there was usually some surplus provided in speed and power to exceed the maximum cutting capacities of high speed steel.

Next came the cast non-ferrous alloys of cobalt, chromium and tungsten. The first of these were introduced before the last war. They can be safely used at cutting speeds from 100 to 200 ft. per min. in machining steel. More recently, a modification of these cast non-ferrous alloys was developed. It is primarily composed of tungsten and tantalum carbides in a matrix of cobalt and chromium. As in the carbide tools of the steel cutting grades, the presence of tantalum carbide not only adds materially to the hardness, but imparts a lubricating action which reduces chip friction and wear or "cratering." This cutting material is called Tantung G and is made by the Vasco-loy-Ramet Corp. of North Chicago, Ill. It has the characteristics of both high speed steel and the cemented carbides—being hard, yet tough.

These cast non-ferrous materials bridge the gap between high speed steel and the cemented carbides, which first appeared as a cutting tool material in 1928-29. Because of this fact, there are applications where both carbides and the cast alloys can be used in combination.

Take a look at Fig. 2. Here is shown a rough sketch of a combination of tools involved in the machining of a shell having a large differentiation of diameters. Let us assume that the largest diameter is 4 in. and the smallest diameter 1¼ in. And also for the sake of an example let us assume that the shell is being machined at 286 r.p.m.

At 286 r.p.m. the large diameter is being machined at the rate of 300 ft. per min. and the smallest at the rate of 93 ft. per min. It is obvious that cemented carbide tools will have to take the burden of the high peripheral speeds as shown by tools numbered 1, 2, 3, and 6. Tool No. 3, however, will start at less peripheral speed than tools No. 1, 2, and 6 because of the contour of the shell. Also bear in mind that tool No. 3 starts in where tool No. 4 leaves off.

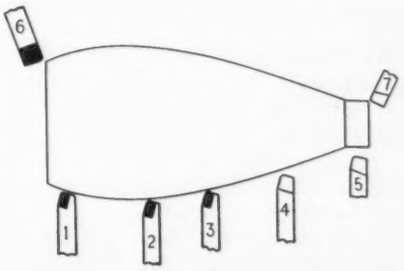


FIG. 2—Cemented carbide tools used in conjunction with Tantung G tools for turning a mortar shell. At the smaller diameters, the peripheral speeds are too low for good carbide performance, but are too high for consistently good performance of high speed steel.

Since the small diameter of the shell involves only 93 ft per min. at 286 r.p.m., it is obvious that this surface cutting speed would be detrimental to carbide tools—like tying up a race horse to a plug horse job. Then again, this speed is too high for consistent production with high speed steel cutting tools—especially where the tool follows the contour of the shell to an increased diameter as does tool No. 4. The only recourse then is to use Tantung for the operations performed by tools Nos. 4, 5, and 7. Assuming that tool No. 4 finishes its cut at 2 in. diameter where tool No. 3 takes off, tool No. 4 will have finished its work at 150 ft. per min. and it is from this point that the cemented carbide tool No. 3 carries on to the completion of its portion of the cut to finish the shell simultaneously with the other tools.

Here we have an example of "teamwork"—an application of tools that suit their respective capacities and environments. The basic principles of this form of teamwork tool set-up is applicable to innumerable other operations involving gang-tooling, such as simultaneous turning and boring operations and the turning of gear blanks with smaller diameter hubs and where diametrical differentiations predominate.

Now let us consider the manufacturer who has a number of machine tools in his shop that were originally built for the use of high speed steel cutting tools. Practically all of these machines have a surplus of power exceeding the capacity of high speed steel cutting tools but not enough to take full advantage of the rip-roaring desires of the cemented carbide tools. Well—there is only one thing to do about that if he wants to keep the same machines in operation at the approximate carbide tool capacity and that is the use of the cutting tool that carries on where high speed steel leaves off.

Reclaiming Worn Files

THE useful life of an average file can be extended approximately three times its normal life by a reclaiming process used by the RCA Mfg. Co.'s plant at Indianapolis. This process was suggested by Jason R. Harris, a plant employee, who received a WPB certificate of individual production merit for the suggestion.

Mr. Harris' suggestion was thoroughly investigated by the plant's engineering department and it was found to be very effective and applicable to files used on both non-ferrous and ferrous metal. At present all files used at the Indianapolis plant are being reclaimed by this method.

The reclaiming process is as follows:

(1) Clean file with wire brush wheel to remove deeply imbedded particles.
(2) Clean and rinse file thoroughly, using ordinary degreasing solution.
(3) Dip in solution made up of following (by volume):
800 cc. water
150 cc. nitric acid
100 cc. sulphuric acid.
(4) Cold water rinse.
(5) Hot water rinse.
(6) Cyanide dip to neutralize.
(7) Cold water rinse.
(8) Hot water rinse.
(9) Dry thoroughly.

The time of immersion in the solution (item No. 3 above) is dependent upon the condition of the files. Experiments will indicate the best time periods. The minimum dipping time is approximately 1 min.

To save time, presorting of the files is recommended. Groups of files showing approximately the same wear should be dipped together. The files should be kept in an upright position while immersed so that the solution can act on both sides.

RCA engineers report that some of the rinse steps listed here may be eliminated and fairly satisfactory results obtained. However, the steps listed here were found to give the best results. Using this procedure, the total handling time for 25 files is about 30 min.

How to Interpret

WHEN NE steels were first produced, the American Iron and Steel Institute undertook the job of directing the testing of them in order to find out how they would respond to heat treatment. This was a big task and had they suggested the standard procedure of machining, heat-treating and pulling standard test specimens, the amount of work would have resulted in serious delay. To save time it was decided that a Jominy hardness test would be the best and quickest method of finding out just what these new steels would do, and this test was adopted as standard.

It is recognized that when steel is heated to the proper quenching temperature and quenched, then the faster the rate of quenching the harder the steel will become. If, therefore, it is possible to find out how a steel hardens at different cooling rates, a very good idea of its hardenability can be obtained, and from this many very useful deductions can be worked out.

In the Jominy end quench test it is possible to determine with a single test how the steel will harden at different cooling rates between about 900 deg. F. per sec. and 4 deg. F. per sec.

The Jominy sample is very simple to prepare. It consists of a sample of the steel being tested, machined to 1 in. round and 3⅞ in. long with a flange on one end 1¼ in. diameter and ⅛ in. thick.

The sample is first normalized, machined to size and then heated to the proper quenching temperature for the steel being treated. It is then inserted in a hole in a fixture, see Fig. 1, so that it hangs vertically on the flange, over a ½ in. round orifice which is ½ in. below the bottom end of the sample. The hole in the fixture will pass the bar but not the flange.

Water comes through the ½-in. orifice with sufficient pressure to rise to a height of 2½ in. when the sample is not in place, this being controlled by a gate valve. The water, when making the test, is allowed to continue to flow until the sample is practically cold.

Smooth, flat surfaces are then ground 0.015 in. deep, lengthwise on opposite sides of the sample. Rockwell hardness readings are then made at 1/16-in. intervals from the quenched end, along with the length of the ground surfaces, as shown in Fig. 2.

The rate of quenching is, of course, very fast on the bottom end and because the heat must pass through the sample by conduction, the top portion is quenched very slowly.

This means that the same piece of steel has been quenched at different rates starting with a very rapid quench at the bottom to a very slow quench at the top. By running Rockwell hardness tests along the side of the sample from the bottom to the top it is possible to find what hardness was developed by different rates of quenching.

These results are, therefore, a measure of the hardenability of the steel and furnish a method of comparing several different steels as well as making it possible to predict how they will respond to heat treatment.

It should be noted that the various interpretations of the Jominy end quench test for the determination of tensile strength, yield point, reduction of area and elongation will apply only to fully quenched steels ranging in quenched hardness from approximately 200 to 400 Brinell. These interpretations do not apply to extremely hard steel, nor to steel which has been treated to hardness below 200 Brinell, nor to steel that is annealed, normalized, or in the "as rolled" condition.

The deductions which may be made from the result of a Jominy test are numerous and very useful. Careful laboratory experiments have indicated just how rapidly the Jominy sample cools at different distances from the quenched end. These rates of cooling are shown in Table I.

All heat treaters know that when a relatively large bar is quenched the center will not get as hard as the surface. The reason is that the center of such a bar cools more slowly than the surface.

Table II indicates the cooling rate at the surface, half-radius, and the center of different sized bars when quenched in water and also in oil. These figures were developed by laboratory experiments.

If it is desired to know how hard a certain type of steel will get at the center of a water-quenched 3-in.

TABLE I

Cooling Rate in Jominy Test

Rate of cooling in degrees Fahrenheit per sec. a 1300 deg. F. at the distance indicated from the water cooled end of a standard Jominy end-quenched specimen in sixteenths of an inch.

1/16—600 deg. F.	7/16— 37 deg. F.	1 — 10 deg. F.
1/8—190 deg. F.	1/2— 30 deg. F.	1⅛—8.5 deg. F.
3/16— 99 deg. F.	9/16— 26 deg. F.	1¼—7.2 deg. F.
1/4— 72 deg. F.	5/8— 22 deg. F	1½—5.5 deg. F.
5/16— 56 deg. F.	3/4— 18 deg. F.	2 —4.3 deg. F.
3/8— 44 deg. F.	7/8— 14 deg. F.	

TABLE II

Cooling Rates of Round Bars

Rate of cooling in degrees Fahrenheit at 1300 deg. F. at surface, half-radius and center of different sized rounds—quenched in water and oil.

Diameter "D"	Surface	Half-Radius	Center
1-in. Round			
Water quenched	850 deg. F.	135 deg. F.	100 deg. F.
Oil quenched	120 deg. F.	53 deg. F.	45 deg. F.
2-in. Round			
Water quenched	550 deg. F.	46 deg. F.	32 deg. F.
Oil quenched	58 deg. F.	24 deg. F.	18 deg. F.
3-in. Round			
Water quenched	400 deg. F.	27 deg. F.	15 deg. F.
Oil quenched	30 deg. F.	12 deg. F.	9 deg. F.
4-in. Round			
Water quenched	100 deg. F.	14 deg. F.	8 deg. F.
Oil quenched	15 deg. F.	6½ deg. F.	5½ deg. F.

Jominy Test Results . . .

. . . The Jominy end quench test has proved to be of great value in the effort to convert to the use of NE steels. Presented herewith is a practical discussion written in simple language, of the use of this test in selecting suitable NE grades as substitutes for regular SAE and other alloy steels. This discussion is abstracted from the booklet "National Emergency Steels", published by Joseph T. Ryerson & Son, Inc. Other articles on NE steels have appeared in THE IRON AGE, issues of Aug. 6 and Sept. 17, 1942.

round bar, for example, this may be approximately determined from the Jominy test of the same steel.

Table II indicates that a 3-in. round bar, when quenched in water, will cool at the rate of 400 deg. F. per sec. on the surface, 27 deg. F. per sec. at the half-radius, and 15 deg. F. per sec. at the center.

By referring to Table I, it will be seen that the Jominy test piece cools at 15 deg. F. per sec., at approximately ⅞ in. from the quenched end and, therefore, the hardness of the Jominy sample at this point will be practically the same as the hardness of the 3-in. round bar at the center because the cooling rate is the same.

If the quenched hardness on the surface, of the same 3-in. round bar is in question, Table II shows that a 3-in. round bar quenched in water cools at about 400 deg. F. per sec. at the surface. Reference to Table I indicates that the Jominy sample cools at 400 deg. F. per sec. between 1/16 and 2/16 in. from the quenched end and, therefore, whatever hardness the Jominy test showed at this same location will be approximately the hardness of the 3-in. round bar on the surface.

It is possible to continue deductions from the Jominy test to determine approximate tensile strength. Suppose, for example, that it is desired to know the approximate tensile strength, yield point, elongation and reduction of area of this same 3-in. round bar after quenching.

By reference to Jominy test hardnesses and Tables I and II, the Rockwell hardness for the surface—½ radius and center of the 3-in. round after quenching, as explained in the previous paragraphs, are given. Now referring to Table III which starts out with Rockwell hardness and develops from these the Brinell, tensile strength, yield point, elongation and reduction of area. These figures are the result of tabulation of many actual results but must be considered only approximately correct to be used only as a guide.

For example, here is an actual case, together with the steps used in working out a problem. Assume that a Jominy test has been run on a sample of NE 9440, and Rockwell readings as shown above have been obtained. It is desired to determine what physical properties will be developed at half radius on a 3-in. round bar of this steel when oil quenched and before drawing. The following sequence shows how this information is developed:

1st step—Table II shows that a 3-in. round oil-quenched specimen will cool at the rate of 12 deg. F. per sec. at half-radius.

2nd step—Table I shows that the Jominy test specimen cools at approximately 12 deg. F. per sec. at a point 15/16 in. from the quenched end.

3rd step—The sketch, Fig. 2, shows that at 15/16 in. from the quenched end of the Jominy test of the NE 9440 sample, the hardness was 35 Rockwell C. It is, therefore, known that the hardness of the 3-in. round

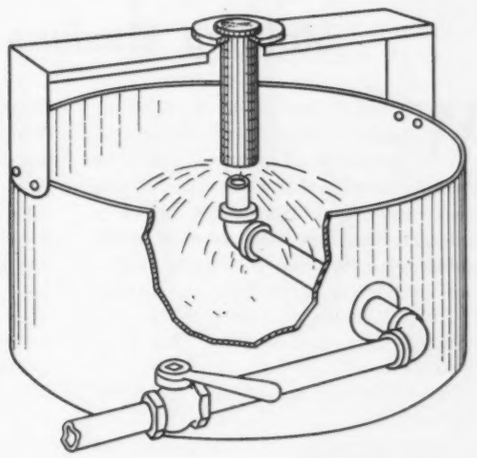


FIG. 1 — Cutaway view showing fixture for making Jominy hardenability tests. The test specimen is shown hanging in the flange.

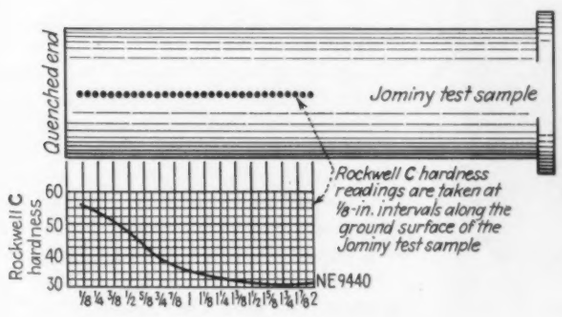

Quenched end
Jominy test sample
Rockwell C hardness readings are taken at 1/16-in. intervals along the ground surface of the Jominy test sample
Rockwell C hardness
60
50
40
30
NE 9440
1/16 1/4 3/8 1/2 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 1 5/8 1 3/4 1 7/8 2

FIG. 2 — Diagram of Rockwell C readings on a standard Jominy end quench hardenability test sample of NE 9440 steel.

TABLE III

Approximate Physical Properties in Relation to Hardness

Rockwell C Hardness	Brinell Hardness	Tensile Strength, Lb. Per Sq. In.	Yield Point, Lb. Per Sq. In.	Per Cent Elongation in 2 in.	Per Cent Reduction of Area
15	200	95,000/105,000	70,000/ 80,000	22/28	60/68
20	225	106,000/119,000	87,000/100,000	21/26	57/65
24	250	118,000/132,000	102,000/112,000	20/25	55/63
28	275	130,000/145,000	115,000/125,000	18/23	52/61
31	300	142,000/158,000	127,000/135,000	17/21	50/58
34	325	153,000/172,000	137,000/146,000	16/20	47/56
37	350	165,000/185,000	150,000/159,000	14/18	45/54
39	375	176,000/200,000	163,000/172,000	13/16	42/51
42	400	187,000/221,000	175,000/184,000	11/15	40/49

It must be remembered that these figures are based entirely on hardness and show only the probable physical properties which are usually associated with such hardness. These relationships have been developed by observation of many actual tests. These figures will be reasonably accurate only in the case of fully quenched steels and will be misleading if interpreted to apply to steels of lower than 200 or higher than 400 Brinell hardness. In translating Jominy results, this table is apt to be more accurate for alloy steels of 0.30 carbon or higher, because when low carbon steels are involved, the actual yield points will be less than those indicated.

TABLE IV

Approximate Relationship of Drawing Temperature and Tensile Strength

Drawing Temperature, Deg. F.	Tensile Strength, Lb. Per Sq. In.
400	235,000/290,000
600	210,000/265,000
800	170,000/225,000
1000	125,000/185,000
1200	100,000/150,000

This table is compiled from averages of a large number of tests conducted on many different alloy steels having a carbon range of from 0.35 to 0.45. These steels were all fully quenched. The figures may be used as an approximate guide for round bars up to about 1½ in. in diameter. No great accuracy is expected in this relationship, but these figures may prove useful in determining the drawing temperature to use in an initial test.

at half-radius will be 35 Rockwell C, because at that point it will be hardened at the rate the Jominy test was hardened at 15/16 in. from the quenched end.

4th step—Conversion Table III shows that 35 Rockwell C is approximately the same as Brinell 325.

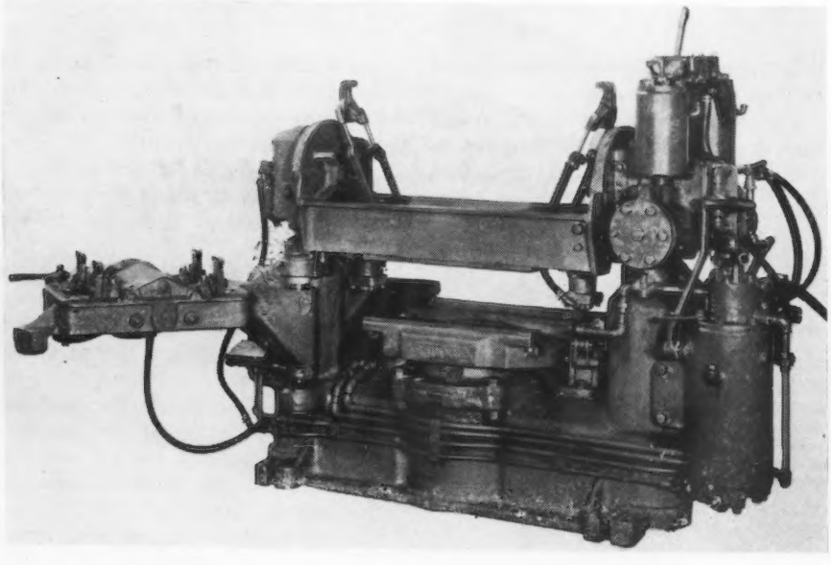
5th step—Table III shows that because the hardness of the 3-in. round at half-radius will be 325 Brinell the approximate physical properties at half-radius after oil quenching will be: Tensile strength, 153,000 to 172,000 lb. per sq. in.; yield point, 137,000 to 146,000 lb. per sq. in.; elongation in 2 in., 16 to 20; per cent reduction of area, 47 to 56.

It should be noted that these physicals are in the as-quenched condition and naturally tensile strength and yield point will be reduced, the elongation and reduction of area will be increased by whatever draw temperature is used following the quench.

Molding Machine Designed for Women Operators

WOMEN are about to conquer another stronghold of men in industry. They are going to work in the foundry, the last place where anyone might expect to see a woman. Foundry work is now being adapted to feminine strength, ability and sensitivity, according to Russell F. Lincoln, sales manager of the machine division of the Osborn Mfg. Co., Cleveland.

Some time ago the Osborn company was called upon to build a molding machine capable of producing molds for the aluminum cylinder heads for airplane engines. The cylinder head was designed to provide a large number of closely spaced cooling fins. Operation of the earlier machines built for molding cylinder heads did not take a very great amount of muscle, from the masculine standpoint. The operator's hardest job was to roll over the machine table carrying a metal pattern and a half flask of sand, weighing in all, 900 lb. The effort takes about a 75-lb. pull, which is little too tough a job for a 100-lb. woman.



But after the necessity for employing women in aviation factories became acute, an aeronautical engine company placed with Osborn an order for a number of these machines redesigned as illustrated to permit women to operate them. The company developed a special mechanism for that purpose, which mechanically performs the rollover operation without any exertion to speak of on the part of the operator. All she has to do is to open an air valve and then give the rollover table a slight manual start. This manual start has been retained as a safety factor; the operation is easily and safely performed.

The nature of these molds is such that any shock during the rollover operation would damage the delicate sand sections between the fins and result in a scrap casting. To control this situation Osborn engineers have produced a power rollover mechanism built around a double acting hydraulic piston using air on oil as a source of power and providing an oil cushion at both ends of the stroke. The mold is rolled over with a smooth motion from which all starting or stopping shock has been eliminated.

Extruding Coatings on Welding Electrodes

By HERBERT CHASE
Consulting Engineer

. . . Up until very recently considerable secrecy surrounded the manufacture of arc welding electrodes. Part of the veil was lifted in the review on "Welding" which appeared in the Annual Review number of THE IRON AGE on Jan. 7. In the current article, the equipment for coating nickel alloy rods at one of the International Nickel Co. plants is described and illustrated in considerable detail. The process centers around the hydraulic extrusion press.

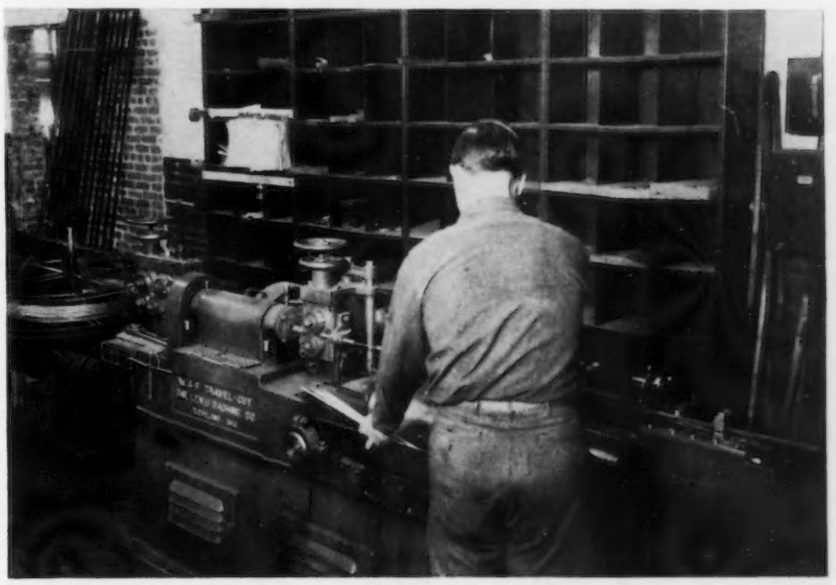
IN arc welding pure nickel, Monel, Inconel and steel sheet clad with with these materials, it is essential to employ rods of similar analysis, coated with a flux designed especially for use with these materials. Welders may take this more or less for granted yet have little or no idea as to how the rods are made and given a uniform coating of flux. The process of manufacturing rods of this type is the result of long development by the International Nickel Co., Inc. It necessitates much care and the use of some specialized equipment.

Production of the welding rods in question really starts in a mill where the wire in the various alloys named or in pure nickel is drawn and coiled. This production is similar to other wire drawing and need not be dealt with here. Coils weighing 95 to 100 lb. each are delivered to the processing machines.

To insure satisfactory coating, it is necessary that rods to be coated are perfectly straight; hence the first operation is to put the coiled wire on a reel and feed it through a straightening machine. The machine used, Fig. 1, is known as a No. 4-F "Travel-cut" and is a product of the Lewis Machine Co. In this machine, one set of small rolls feeds the wire from the reel and pushes it into a rotating head. Issuing from the head, the wire passes between a second set of rolls which exert a pulling action and advance the straightened wire to a station where it is automatically cut to the required length, the lengths falling into a trough made to receive them. In the straightening head, which is a rapidly rotating tube, there are a series of adjustable guide blocks set radially. The wire passes over the ends of these hardened guides which are not in a straight line, but are so set that the wire travels a sinuous course deviating from the axis of rotation. In rotating around the wire, the guides effect the required straightening action. They are adjusted, of course, for wire of different diameter and different hardness or temper. Rods cut to length are removed from the trough by hand and are placed in tote boxes for transfer to the next machine.

In order to properly size the diameters of the cut lengths, remove end burrs and all foreign matter, the rods are run through a Cincinnati centerless grinder, Fig. 2, which is equipped with coarse-grain wheels. Grinding is done dry and results in a clean bright surface but one on which the grinding marks show up rather prominently. In other words, though clean and true, the surface is somewhat roughened and this helps to insure good adherence of the coat-

FIG. 1—Machine employed for straightening nickel and nickel alloy wire and cutting it into the required lengths for use in making welding rod. Wire is drawn from the coil in the background and cut lengths fall into the trough at the operator's left hand.



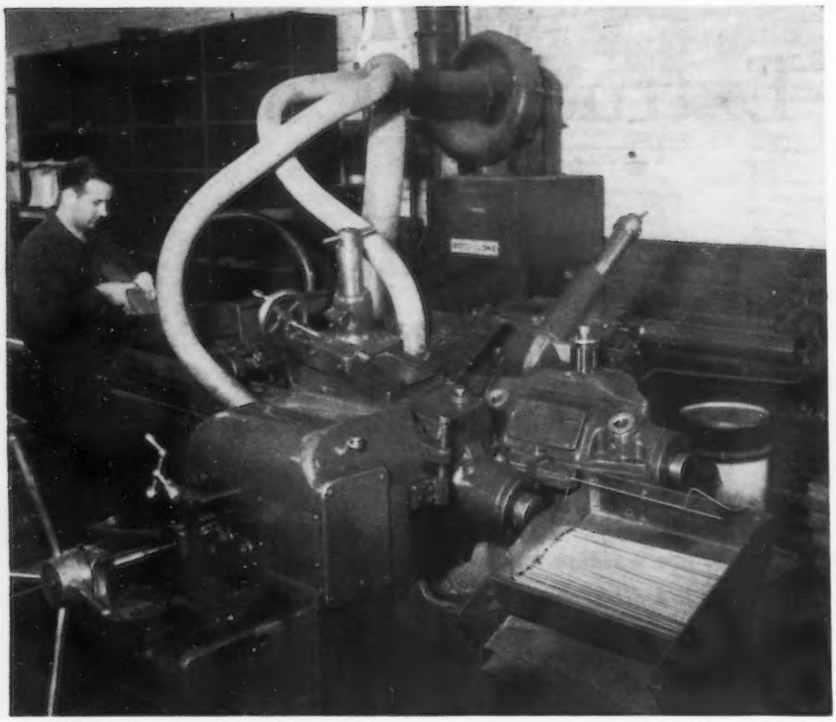
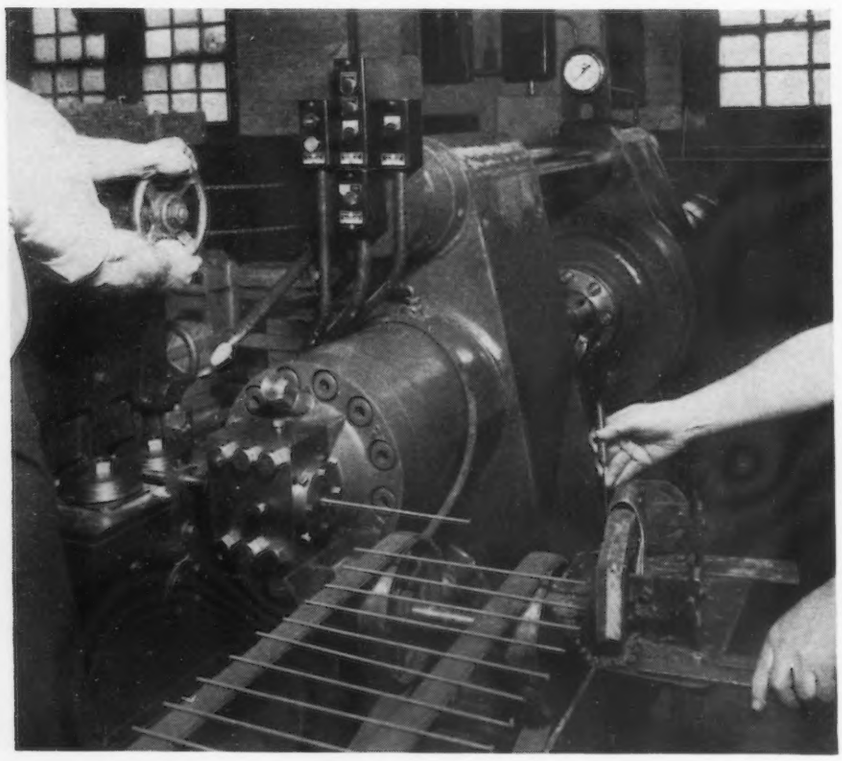


FIG. 2—Operator feeding rods into the centerless grinder hopper from which they feed through the machine automatically and fall into the receiving tray in the foreground, ready for coating.

ing which is next applied. The grinder is equipped with a dust-collecting exhaust system so that no dust issues into the room.

The coating ingredients are mixed in a Patterson Kneadmaster and then are rammed into a cylinder to produce slugs for loading into the coating machine. Although the slugs are hard enough to be handled, they are sufficiently plastic to be extruded. As it is necessary that the flux be applied in a coat of uniform thickness, the rod is carefully centered and positively guided through the extrusion head, being held accurately concentric with the hole in the extrusion nozzle or die. This die is made of tungsten carbide to resist abrasion.

FIG. 3—An H-P-M extruding press as it appears from the end in which rods are automatically fed through and receive an extruded coating of flux.



Extrusion is done in an extruding press, Fig. 3, made by the Hydraulic Press Mfg. Co., Mt. Gilead Ohio. This is a self-contained unit of 150 tons capacity. The press is equipped with a material chamber 6 in. in diameter and 30 in. deep, in which the slugs to be extruded are placed. Two pumps, one on each end of the driving motor, are employed; one being a high-volume, low pressure (500 lb. per sq. in.) gear pump, and the other an H-P-M Hydro-Power radial pump having a variable stroke, and set for a maximum pressure of 1500 lb. The pumps actuate the double-acting extruding ram and are so arranged that both pumps deliver for rapid traverse of the ram, but during the extrusion stroke which requires full pressure, the radial pump automatically takes over and the gear pump is unloaded. An H-P-M piston type operating valve is controlled by a hand lever, near the extrusion die, where the operator stands. A convenient handwheel permits the operator to adjust the speed of the extrusion plunger by varying the stroke of the radial pump, Fig. 4.

Rods are fed into the extrusion head at right angles to the axis of the extrusion ram, and are pushed through the guiding tube by an automatic feeding device which is provided with a hopper and a mechanism for advancing the rods at the rate required. The extrusion ram forces the flux around the rods as they pass continuously through the extrusion nozzle or die. This action applies a uniform coating of flux, pressed firmly against the rod. The coated rods fall on a variable speed conveyor belt which moves in a transverse direction and carries them into a stripping unit which cleans the ends of the rods of flux and feeds them into frames for transfer to baking ovens. Rods are commonly made in 11 or 14-in. lengths, depending upon the diameter.

The rods are literally shot through this extrusion machine at a rate which can be adjusted from 80 to 380 a min.

On a cleated belt the rods are caused to pass under rollers having a thick covering of sponge rubber which is quite soft and does not injure the coating on the rods, al-

though the coating is not yet fully hardened. The rollers cause the rods to be rotated slowly as the rods are advanced between a pair of wire brushes which straddle a ¾-in. length at one end of the rod. Both brushes are circular and are motor driven. Their function is to clean the flux off the area they contact so that a good electrical contact can be made with the rod holder in actual use. Another brush cleans the opposite tip end of flux to facilitate the striking of the arc.

Continuing along the belt, rods are finally discharged into racks made of angle iron and, as the racks are filled successively, they are transferred by hand into drying ovens where the coating is baked for 6 hr. at 200 deg. F. to harden the coating. After baking and cooling, rods are ready for wrapping in 5-lb. packages which are labeled and then are dipped in paraffin to exclude moisture. Packages are then ready for shipment.

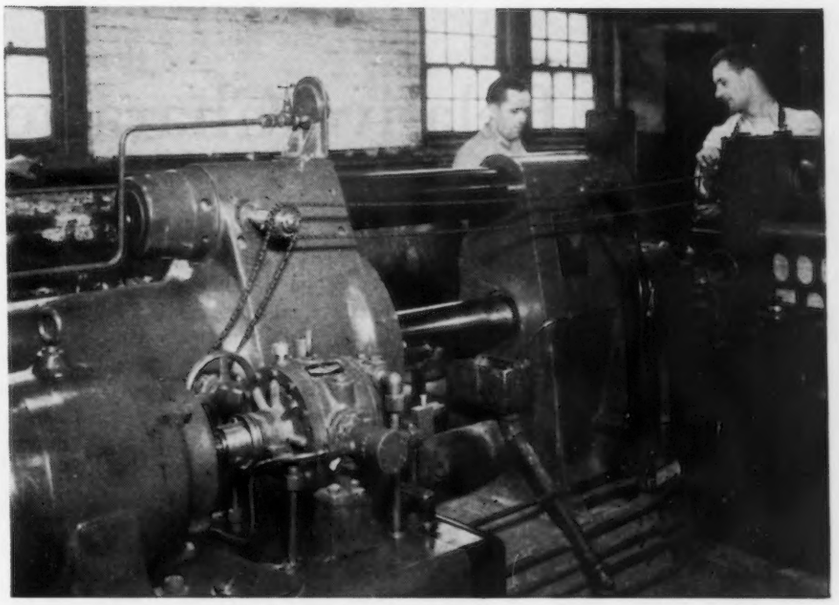


FIG. 4—A rear view of the welding rod coating press. In the foreground is the H-P-M Hydro-Power radial pump with remote handwheel for controlling the speed of the extruding plunger.

Quick Healing Burn Treatment

THE treatment and cure of industrial burns of limited areas has been extended through the development of Hexene-ol, a fatty alcohol product discovered in the development of synthetic rubber. Hexene-ol, explained Dr. Benjamin Levine of Mt. Sinai Hospital in Cleveland, in addition to forming an occlusive dressing on a burn, thus reducing pain, also has an analgesic effect that goes beyond the stage produced by mere application of an oily substance to the burned skin.

The product was used both as a stearified substance with 1 per cent zinc stearate and in its natural state. The therapeutic results were the same with both forms. Applied to normal skin, Hexene-ol produces an increased localized perspiration which is caused by direct stimulation of the sudoriferous glands or by stimulation of the sympathetic nerve fibers.

It was found in the treatment of 238 burns of various types, including six chemical burns, eight carbon dioxide burns, a molten lead burn, and a burn from short wave cautery, that advantages of this treatment were five-fold. When Hexene-ol was applied soon after the burn was sustained, blistering was prevented; relief from pain was prompt and lasting, although the drug doesn't produce local anaesthesia; healing was rapid and compared favorably with any preperation so far used in the treatment of burns; secondary infection was prevented; and the incident of irritation from the drug was moderate, being less than 1 per cent, or two cases in the series of treatments.

Most of the burns treated with Hexene-ol were those sustained in industrial plants. In one plant 150 burns were treated, the patients being mostly maintenance and foundry men with burns caused by hot metal, rivets, gears, water, oil, steam pipes, soldering irons, solder, etc. The majority of the burns were either first degree or first and second degree. First degree burns cleared up in 24 to 48 hr., while it took five to seven days to clear up the second degree burns. The third degree burns treated required 14 to 18 days for healing. However, the greatest advantage claimed was that the victims lost no time from work. In all cases Hexene-ol was applied almost immediately after the burn was sustained, and relief from pain was almost immediate, usually within five minutes after application. The incident of second and third degree burns was considerably less after the application of Hexene-ol than with proprietary burn ointments.

Hexene-ol prevented undue damage to the burned skin and many burns remained first degree that might otherwise have become second degree burns. Oil, grease, and often grime were removed by the medication when applied to the burned areas.

A third degree burn was sustained by a woman who had spilled hot molten lead on her foot while attempting to pour it into a mold. This burn was completely healed in three weeks by the use of the drug. Another patient had his face splattered with boiling sulphuric acid, which was washed off and he was treated with Hexene-ol within 15 min. of the time of the accident. The pain was relieved in 10 minutes and the lesions peeled for 10 days. No visible scars were left.

Relative Characteristics of Non-

THE accompanying tables, prepared by the General Electric Schenectady works laboratory, show in handy form a comparison of the advantages and disadvantages of various casting methods for non-ferrous metals and the tolerances permissible in designing castings to be made in metal molds.

Sand castings are still the most common form of non-ferrous castings, requiring the lowest cost of tools and the shortest time to get into production. However, they require more direct labor in both foundry and machine shop and are more variable in structural density and physical properties than metal mold or plaster of paris castings.

Castings made in plaster of paris molds offer as good surface appearance, sharp outlines and approximately the same tolerances as metal mold castings, at considerably lower "tool" cost. They are more competitive against brass and bronze metal mold castings than against aluminum. Due to the low thermal conductivity of plaster of paris castings can be made much thinner than in sand or even in metal molds. There is less danger of internal porosity than in sand castings, but the structural strength is lower.

Due to the closer tolerances and good surface of metal mold castings, they generally obviate the expensive machining operations necessary with sand castings, except for very close tolerances (see Table II). Permanent mold castings are characterized by a dense, fine grained structure, free from shrink holes or blowholes. However, it is not possible to maintain as close tolerances and to cast sections as thin as in die castings or plaster of paris castings. Although applicable to zinc, aluminum and magnesium alloys as well as certain bronzes (and cast iron), the process is not particularly suitable to yellow brasses high in zinc on account of the zinc oxide fouling the metal dies.

Die castings, whether made by a gooseneck machine or a cold chamber machine, are characterized by sharp outlines and contours, fine, smooth surface and high speed of production with low labor cost. They all have a hard skin with a softer core due to rapid chilling of the surface of the casting from the metal mold. Consequently, machining of the surface will disproportionately reduce the strength of the

TABLE I

Relative Characteristics of Different Casting Methods for Non-Ferrous Metals

(Numbered in order of preference. For example 1 indicates first preference, 2 is second choice, etc.)

Casting Process	Sand	Plaster of Paris	Centrifugal	Permanent-mold	Die	Cold-Chamber Pressure	Notes
Porosity	6	2–1	1–2*	3–4†	5	4–3	
Surface	6	1	5–4*	4–5†	2–3	3–2	
Sharpness of Outline Tolerances	6	3	4–5*	5–4†	2	1	
Strength (Solid Metal)	5–6	6–5	3*	4†	2–1	1–2	
Thin Sections	5	1	6	4	3–2	2–3	
Tool Cost (Pattern or Molds)	1	3	2	4	5–6	6–5	Tool cost and cost per casting depend on number of patterns per plate or impressions in die; the more castings can be made at one operation, the lower the labor cost per piece, with inversely increasing tool cost. Sand and plaster of Paris molds lend themselves more economically to multi-impressions than metal molds.
Speed of Production and Labor Cost per Casting	On basis of most economical tool setup (as to number of impressions on one pattern plate or in one die) for comparative production quantities.						
	For small and moderate production, including setting up of die. 1	2	4	3	5–6	6–5	
	For large production: 5	6	4	3	1–2	2–1	
Possibility to save Machining	6–5‡	3	5–6‡	4	2–1	1–2	

* In metal left after removal of drossy material from inside of wall.
† Only in material next to metal mold in case of semipermanent molds.
‡ May be reversed in certain cases.

Ferrous Casting Techniques . . .

TABLE II

Tolerances for Metal-Mold Castings

(These data should be used for general guidance only. Actual design conditions will affect possible minima or maxima.)

Manufacturing Method	Metal	Tolerances Within Solid Die	Minimum Wall Thickness in Inches (See Note—1)	MINIMUM CORED HOLE		Minimum Draft of Side Wall or Hole, Inches per Inch of Depth
				Maximum Diameter, In.	Maximum Depth by Diameters	
Remarks		Tolerances should be as liberal as possible in the interest of low die and casting cost, where it is not necessary to have them to the limits given below. Closer limits than those given in table can be had, but only at higher die costs. Tolerances affected by moving members must be somewhat greater (across parting lines, etc.)	Varying with alloys (Aluminum-silicon alloys, for instance will cast in thinner sections than aluminum-copper alloys.)	Cores for casting holes produce a beneficial chilling effect. Therefore, where possible, all holes should be cored, except when so small or deep that cores may be warped or bent under the shrinkage stresses of the freezing metal, or when drilling or punching is less expensive.		Draft per side on walls where metal shrinks away from die could be somewhat smaller. Liberal draft results in superior surface finish.
Gooseneck or Cold-Chamber Die Casting	Magnesium Alloys	±0.0015 in. per in., but at least ±0.003 in.	0.050 for small sections. More for larger sections.	Smaller than 3/32 (Not cored) 3/32 to 1/4 ..... 3 times 1/4 to 1 ..... 3-5 times		0.010
	Aluminum Alloys	±0.0015 in. per in., but at least ±0.003 in.	0.035 for small sections. More for larger sections.	Smaller than 3/32 (Not cored) 3/32 to 1/4 ..... 3 times 1/4 to 1 ..... 3-6 times		0.010
	Zinc Alloys	±0.001 in. per in., but at least ±0.0025 in.	0.020 for small sections. More for larger sections.	Smaller than 3/32 (Generally not cored) 3/32 to 1/4 ..... 3-8 times 1/4 to 1 ..... 6-8 times		0.005
	Brass and Bronze	±0.003 in. per in., but at least ±0.005 in.	0.050 for small sections. More for larger sections.	Smaller than 3/16 (Not cored) 3/16 to 1/4 ..... 2 times 1/4 to 1 ..... 2-4 times		0.015
Permanent Mold Casting	Magnesium Alloys	±0.0015 in. per in., but at least ±0.010 in.	0.1875 (regardless of whether surface is rough or smooth).	Smaller than 1/4 (Generally not cored) 1/4 to 1/2 ..... 3 times 1/2 to 1 ..... 3-6 times		0.015
	Aluminum Alloys	±0.0015 in. per in., but at least ±0.010 in.	0.125 (0.090 where at least one side can be made reasonably rough).	Smaller than 1/4 (Generally not cored) 1/4 ..... 3 times 1/4 to 1 ..... 3-6 times		0.015
	Bronze	±0.005 in. per in., but at least ±0.010 in.	0.075 for small sections. More for larger castings.	Smaller than 1/4 (Generally not cored) 1/4 to 1/2 ..... 2 times 1/2 to 1 ..... 2-4 times		0.020

NOTE 1: The minimum wall section that can be cast with different alloys and by different processes is not absolutely fixed. It depends on the size and design of the casting, location of the section with reference to heavier adjacent sections, and on the die, the alloy, type of machine, and the pressure applied. In general, the lower the melting point and the more fluid the metal, and the shorter the distance the metal must flow between the chilling walls of the die or mold, or the faster it traverses the distance, the thinner the wall may be. There is practically no limitation on casting heavy wall thicknesses as may be encountered in commercial applications. Sections somewhat heavier than minimum castable are recommended (especially for die and pressure castings) when castings are to be plated, as they hold greater promise for smooth surface.

FINISHES: Metal-mold castings can be finished with three different finishes as follows and should be marked on drawings to designate type of finish desired.

1. No marking—Commercial: Standard finish produced by commercial, but carefully controlled routine.
2. Decorative: (Required for plating) Free from flow marks and from swirls and other surface imperfections.
3. Poorer than commercial; suitable for unexposed or painted surfaces.

section and will cause warping due to the release of internal stresses held in check by the skin as long as it is unbroken. It will also reduce the leakage resistance against internal pressure. Machining deeper than 0.010 in. maximum is not recommended. When exposed to high temperature, die castings are all likely to blister on the surface due to the expansion of gases trapped inside the casting by the rapidly hardening skin before they had a chance to get out.

Again due to the rapid chilling and the resulting fine grain size of the structure, they all have greater strength than the same composition cast by any other means, although it is difficult to avoid occasional internal porosity, especially in heavier sections.

In the gooseneck type of die casting machine, the cast iron gooseneck which dips the molten metal out of the metal container and transfers it to the die is constantly immersed in the molten metal. When die casting aluminum, there is a strong attack of the aluminum on the iron in the gooseneck and metal container with the result that the aluminum gradually absorbs an unduly heavy amount of iron which affects its ductility, castability, machinability, shock resistance, etc.

Cold-Chamber Machines

In the cold-chamber machine, on the other hand, the metal container is separate from the rest of the machine. A hand ladle dips enough for one shot out of the container and the pouring well is charged only with the contents of the ladle. Between shots, neither ladle nor pouring well is in contact with molten metal. For this reason, it is much easier to hold the iron content down.

The other chief difference lies in the velocity of the metal stream as it fills the die, and the pressure back of the metal when the die is completely filled. Pressure back of the metal and velocity of the metal stream are interrelated. In the gooseneck machine, the pressure is limited by the mechanical strength of the cast iron gooseneck at the temperature imparted by the molten aluminum (around 700 deg. C.), 700 lb. per sq. in. being as high as is safe. In cold-chamber pressure-casting machines, there is practically no limitation, pressures as high as 16,000 or even 20,000 lb. per sq. in. being employed in some cases. Usually, however, lower pressures, on the order of 3000 to 10,000 lb. per sq. in., are used to facilitate the mechanical problem of making the machine heavy enough to provide the locking and holding power to keep the two die halves together under the tremendous impact of the injected metal.

Cold-chamber pressure castings hold out greater promise of solid, dense structure, sharp outline, and extremely thin section than gooseneck castings, but these results cannot be obtained unless dies are most carefully vented and gated.

Due to their uncertain structural condition, gooseneck castings should never be used in any application which bears serious responsibility for maintenance of service or protection against trouble. Cold-chamber pressure castings may be used if expert care has been expended on mold design.

There is another important difference between the ordinary die-casting machines (both piston and gooseneck) and the cold-chamber machines in that the casting mechanism of the die-casting machines is constantly immersed in the hot molten metal, whereas in cold-chamber pressure machines it is immersed only for short, intermittent periods. As a result, neither the standard piston nor gooseneck machines can be used for the higher melting point alloys, like brasses and bronzes, whereas cold-chamber pressure machines can be.

Cold - chamber pressure - cast brasses and bronzes, however, have not yet found the same wide popularity as die castings or cold-chamber pressure castings in zinc and aluminum, although excellent products have been turned out. The main difficulty lies in the high cost of the dies, since the tool steel industry has not yet been able to produce a steel for the dies which will last as long against the high temperature at which the cuprous alloys are cast as die steels for aluminum or zinc. Plaster of Paris or permanent mold castings are still competing favorably with cold-chamber pressure cast brass or bronze except where production is so large and saving in machining due to the closer tolerances so considerable that the high cost of molds for the cold-chamber pressure castings can be absorbed.

Correct Clip Fastening Procedure

WHEN fastening wire rope, clips should not be drawn up too tightly against the rope, according to F. L. Spangler, but neither should they be permitted to become loose. Drawing the bolts too tightly misshapes and weakens the rope. With the clips fastened, all nuts should again be tightened after the rope has been put under tension. Clips should be tightened with every rope inspection.

When inspecting clip fastenings it is extremely important, according to Mr. Spangler, to examine the rope at the last clip farthest away from the loop or bight as fatigue breaks often develop at this point since rope vibration or whipping is dampened at that point.

It is important to apply a sufficient number of clips and the minimum number recommended for different sizes of rope is as follows:

Rope Diameter, In.	No. of Clips	Clip Spacing, In.	Length of Wrench, In.
½ to ⅝	3	3	12
¾ to ⅞	4	4½	18
1 to 1⅛	4	6	24
1¼ to 1⅜	4	7	24
1½ and greater	5 to 7	10	24

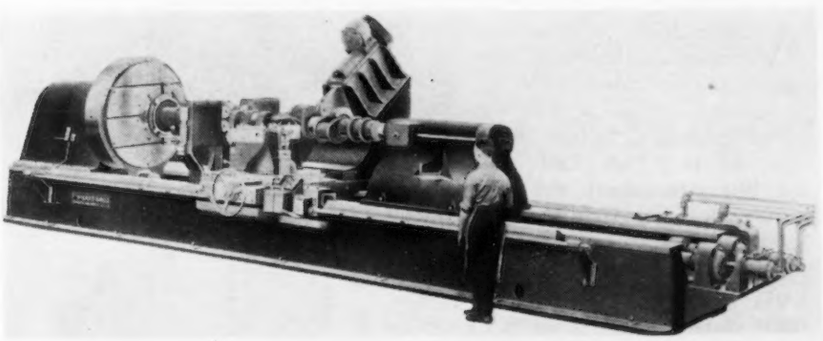
INCORRECT application of clips or bad design reduces efficiency of clip fastenings.

New Equipment . . .

Machine Tools

Further design improvements and construction advances made by machine tool builders are described herein.

WICKES BROS., Saginaw, Mich., has announced a new extra heavy duty universal type crankshaft lathe known as model UH-60. The machine is a single end drive lathe designed for machining the intermediate main line bearings and ends of heavy duty diesel type crankshafts having line bearings up to 8 or 10 in. in diameter. The back roller rest is used for supporting the bearing being machined and is carried in a very heavy back tool housing, movable along the lathe bed to any position. A four-roller steady rest supports a bearing which has been previously machined. A 3-way turret is mounted on the cross slide, providing tooling for the turning, cheeking and filleting operations. The lathe is equipped with hydraulic longitudinal feed to the carriage and hydraulic cross feed to the cross slide. Hydraulic feeds provided are from 0.005 to 0.125 in. per rev. through variable delivery hydraulic pump. Swing over the bed is 61 in. and over the cross slide 36 in.

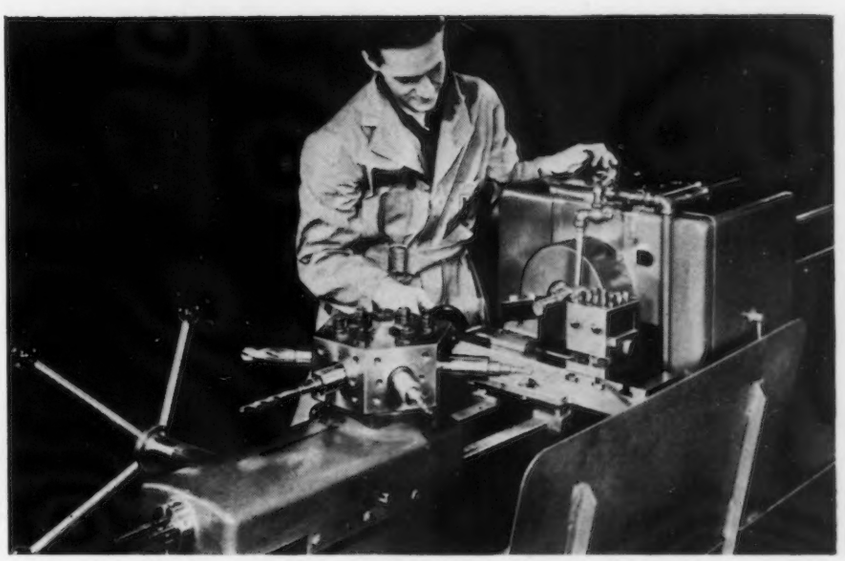


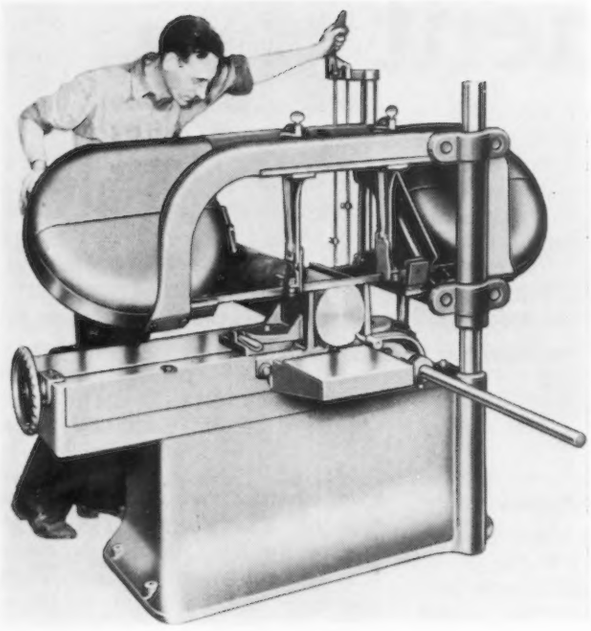
Pinion Cutting Machine

THE pinion cutter made by the *Waltham Machine Works*, Waltham, Mass., is now made with adjustment to give variable stroke lengths. Strokes of 3/16 to 1-3/16 in. can be taken. This same adjustment permits setting of machines so that short strokes can be taken at any point of the work. Automatic indexes permit indexing for any number of positions and uneven spacing can easily be taken care of. The machine can be arranged for hand feeding or magazine feeding where feasible. These machines are built for single or multiple cutters.

Light Turret Lathe

THE Oster No. 601 Rapiduction lathe, made by the *Oster Mfg. Co.*, Cleveland, is now equipped with automatic indexing. The machine has a capacity of 1½ in. (round) for cutting-off, boring, tapping, reaming, facing, threading and for other operations. Where three or fewer operations in sequence are required, the machine can be furnished with a plain saddle instead of the six-station turret. A worm or direct drive to the spindle can be furnished, with a two-speed motor, reverse and electric brake control. The motor is connected by means of multiple V-belts, with speed changes obtained with quick-change sheaves.





Band Saw

THE new Wells metal cutting band saw, Model V-12, introduced by *Wells Mfg. Corp.*, Three Rivers, Mich., has a capacity of 13 x 16 in. rectangular and 13 in. in diameter, round. This machine offers a hydraulically controlled feed and lift apparatus, and is equipped with a ¾ hp. electric motor which drives the blade at speeds of 53, 94 or 148 ft. per min. The machine has a hand-operated quick-acting vise.

Hydraulic Cutting-Off Unit

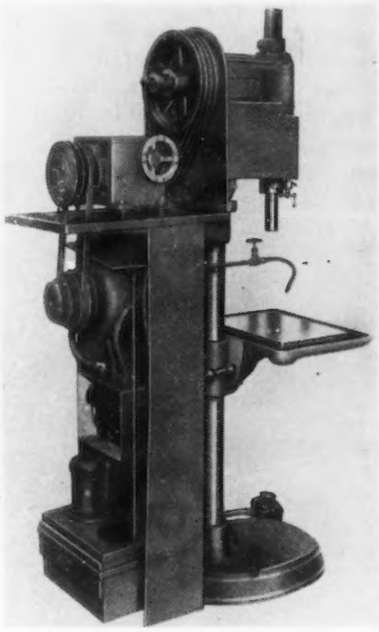
THE *Landis Machine Co.*, Waynesboro, Pa., has recently developed a hydraulically controlled cutting-off unit, which replaces the standard carriage, crossrail, and die head of the Landis mill type pipe threading machines where these machines are to be used for the cutting-off operation only. This device consists of two high-speed steel cutting-off tools mounted in heavy slides. These tool slides function through a hydraulic cycle which provides rapid traverse of the tools to the work and rapid retract of the tools after the operation is completed. A single lever controls the forward and return movements of the slide. Complete control of the hydraulic cycle provides variable feed rates for the cutting-off tools and adjustment of the length of travel of these tools for different thicknesses of tubing.

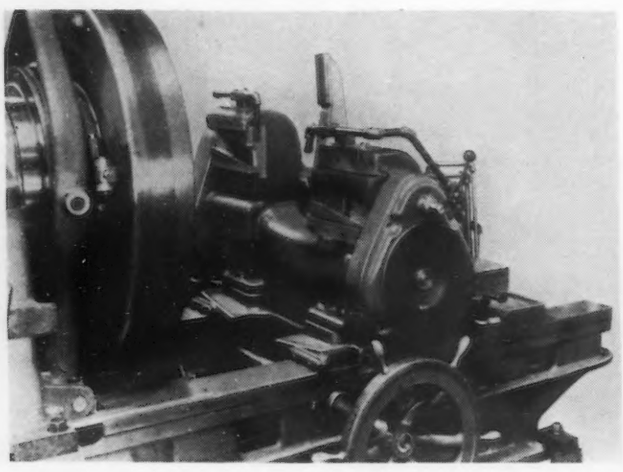
Universal Cutter Grinder

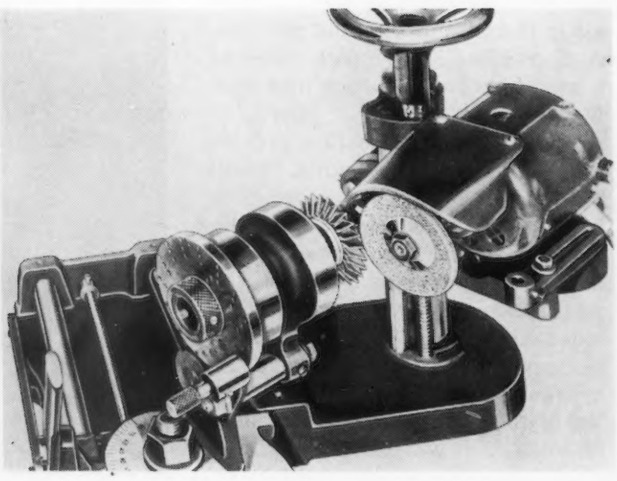
A FLEXIBLE, compact machine known as the Hilco universal cutter grinder has been announced by the *Berco Mfg. Co.*, 429 West Superior Street, Chicago. Furnished with an interchangeable table or flat bed attachment and a special universal index dividing head, the machine may be set up in a few minutes. It will grind any concave, convex, helical, straight, tapered, angle or special cutter up to 6 in. in diameter and saws up to 18 in. in diameter. The dividing head has seven index circles consisting of micrometer placed holes or stops which insure uniformity of cutting edges in the finished cutter.

Tapping Machine

THE *Cleveland Tapping Machine Co.*, Cleveland, has introduced a new model DB, 16 speed, heavy duty lead screw tapping machine with a capacity of 1¼ in. N.C. threads in steel. It has dual push-button control for either automatic or manual operation. It has a visable dial indicator for adjusting the reverse control which is so sensitive that the vertical travel of the spindle can be held to within 0.005 in. limit. The controls are synchronized so that the rotational motion of the spindle is reversed within a maximum of a quarter turn of the spindle at the moment of reversal. The spindle speed range is from 45 to 300 r.p.m.







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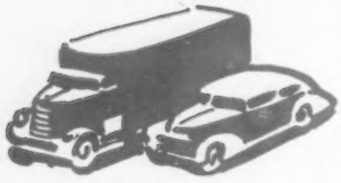
Assembly Line . . .

• Absenteeism lower than in first World War but more significant now because of specialized jobs . . . Taxation seen as a major factor affecting layoffs...Small bonus for regular attendance being considered.



DETROIT—Absenteeism in the Detroit area has not shown any increase of significance for two or three months but as the production load increases it is beginning to cause widespread worry.

General Motors figures that its absentee rate among men runs about 3 per cent, and this approximately is typical of the industry as a whole, perhaps slightly lower. An absentee ratio of 1.5 per cent is normal. The rate of absentees for women employees is about double those proportions.

The difficulty in correcting the situation lies to great degree in the fact that absenteeism is highly concentrated. Detroit figures show that approximately 10 per cent of total payrolls are responsible for 50 per cent of the absences. For the most part these are new workers—many of them of the "fringe" variety, many of them lacking a background of sustained employment, and many of them accustomed to low standards of living, thus lacking the economic incentive for steady work.

This country has not yet seen anything approaching the absentee totals of the first World War, when close to a fifth of shipyard workers were "missing from action" all the time. But it is pointed out in highly industrialized Detroit that absenteeism is much more significant now than it was even 20 years ago, because operations are highly tooled and progressively tooled. Furthermore, in many jobs of medium skilled classification, the places are occupied by newly trained men who know only the job they are doing and no other. Accordingly, if one of them is absent, the entire sequence of work is impaired because it is most difficult to obtain a qualified substitute who temporarily can step into the breach. A case in point is one Detroit plant employing a few thousand men which on a recent day had an absentee total of about 5 per cent of its pay roll. However, a number of the absent men were concentrated in one department, and the upshot was that production for the day was off more than 50 per cent. In a study on this subject, General Motors Economic Analyst A. T. Court says: "The importance of this problem is apparent when you consider that a 5 per cent loss of time for personal reasons may reduce production 15 per cent or more, because the absence of individual specialists breaks up the balance of skills necessary to secure maximum group efficiency."

A roundup from several other major cities on the problem of absenteeism appears in this issue starting on page 95.

THE length of the work week does not seem to have any great relationship to the rate of absenteeism. A check at a considerable number of plants indicates that the absentee ratio at plants working schedules in excess of 50 hours a week is on the whole considerably less than that in many plants whose work approximates 45 hours a week. At the same time, some plants working less than 40 hours a week have a higher absentee ratio than some of the heaviest engaged factories. Obviously, no concrete conclusions can be drawn from studies of this sort (and studies exist which are fairly complete in their findings). The only point of agreement among plant managers is that when work goes more than six consecutive days there is a pronounced increase in absentee ratio, and when work progresses over a level of about 56 hours a week, absenteeism begins to mount.

Further delving into the absentee problem produces the highly interesting fact that women hired in the recent past appear to be working more steadily than do new men. This is interpreted as meaning that many women applying for employment now are housewives or have had steady work in the past, while on the other hand new male employees are less apt to have had backgrounds of regular work.

Ways and means of solving the absentee problem are very seriously being discussed in management and industrial circles in Detroit. One method which has been found to produce rather good results has been that of a personal visit from personnel men to the homes of workers who are out more than a day or two in a row.

More spectacular but perhaps less resultful have been means recently publicized in the daily papers—"Nazi" money in pay envelopes covering lost time, and the like.

SOME companies are considering installation of rather involved questionnaires which must be filled out by employees returning to work after absences, thinking partly that filling out of the questionnaire would reveal underlying reasons for the absences which can be corrected by personal attention.

A most interesting light on this entire problem is thrown from a side position, so to speak, by one individual who is thoroughly in touch with the problem. He believes that forthcoming methods of taxation will have very pronounced impact on the rate of absenteeism. He believes that systems wherein taxes begin after a base rate has been earned may become very destructive to good attendance.

As a means of illustration, assume that forthcoming legislation may provide for payroll deductions to cover the bulk of the tax, as proposed by pay-as-you-go plans. There would be a basic pay which would not be touched. Say, for purposes of illustration, that this was $1500 or roughly $30 a week. The earnings above $30 per week would be taxed (again hypothesizing from 15 to 30 per cent.

This would mean that a worker earning $1 an hour would get $30 for his first 30 hours of work and then from 70c. to 85c. an hour for the next 10 hours which would comprise his regular 40 hours per week. Work over 40 hours, paid at time and a half, would normally bring him $1.50 an hour at his stated pay scale, but this would be reduced by taxes to a level of $1.05 an hour if a 30 per cent tax were imposed. Obviously the incentive for working added hours would decrease quite materially, and

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absenteeism could be expected to climb proportionately.

This analyst, while disfavoring a tax of the Ruml variety, is very much in favor of a straight payroll deduction tax starting with the first $1. In this way, he points out, the government would in effect be taxing the first hours of work rather than the final hours.

TAXATION can be considered as a major factor affecting absenteeism. Other reasons held responsible by industrialists for the current high absentee rate are high wages, price fixing which keeps the cost of living low, and the ease with which new jobs can be found.

Gradual disintegration of the General Maximum Price Regulation can be considered as a factor which will reduce absenteeism, because it will bring commodity prices higher, more in line with inflated wage levels. (Of course, there is no assurance against the fact that if the cost of living goes up appreciably, the level of wages again will move ahead, as sought by the UAW.)

The ease with which jobs can be found is also a variable factor. From the workings of the job stabilization plan of the Detroit District War Manpower Committee during its first few weeks, it appears that job transfers are not too difficult. Accordingly, the penalty of possible dismissal, with inability to find a new place, has no bearing on a worker's attitude when he skips a day or two of work.

Rationing must be considered another factor increasing absenteeism. Man works to provide himself with the wherewithal for the necessities and luxuries of living. But rationing takes purchasing power out of dollar bills and puts it into coupons. As goods become increasingly scarce in the stores this spring and summer—as expected by many ecomomic analysts—another incentive for working will have been removed. If the luxuries and necessities cannot be obtained, the drive to secure the no longer effective wherewithal is naturally lessened.

Beyond all of these concrete factors quite naturally is the psycholological factor of patriotism. It is no secret that military officials have been more worried about the evidently low state of morale in Detroit than about that situation in any other section of the country. The will to work often seems to be well below possible levels. Purchases of bonds are, of course, one manifestation of patriotism. But they do not appear to be at the general point where bond deductions from payrolls are sufficient to bring down incomes to the point where steady work is necessary.

Michigan Factory Payroll Statistics
December—Preliminary

Industry	No. of Plants Reporting	Average Weekly Hours	Average Weekly Earnings	Average Hourly Earnings
Transportation, Machinery and Equipment	161	46.2	$57.99	$1.255
Machinery, Non-Transportation	204	49.6	53.73	1.083
Iron, Steel, and Their Products, Other than Machinery	132	47.1	52.54	1.115
Non-Ferrous Metals & Their Products	54	46.8	53.57	1.144
Forest Products	97	43.9	32.14	.733
Stone, Clay, and Glass Products	36	51.9	49.11	.946
Durable Goods	684	46.7	55.01	1.177

THE recent ruling of the War Labor Board prohibiting overtime compensation for Saturday and Sunday work unless those days are the sixth or seventh consecutive work period appears to have been an interesting factor influencing absenteeism. Personnel men say there seems to be a deep-seated opposition to working on Sunday without any premium pay. When work has not been scheduled in mid-week and Sunday falls on the fifth day, at regular rates, or even on the sixth day at time and a half, absenteeism on the Sabbath is considerably in excess of past experience. Religious scruples seem to multiply at straight time.

One subject which has been up for preliminary discussion, not with any viewpoint to installing it at once but principally with a desire to find out more about it, has been some program of incentive pay, contingent on attendance and production records. That is to say, a worker might obtain a small bonus for regular attendance without absences. Such a plan would necessarily be set up so that if a worker was absent at the start of a tallying period, there would be some means of obtaining incentive pay for later good attendance; or else a break in the perfect attendance pattern might well serve to discourage a worker in the period immediately following to the point that his absentee rate might increase above otherwise expected levels.

One Detroit company, meanwhile, is beginning a very scientific study of the absentee problem. Each absence is being very carefully checked. Personal investigation is under way to determine exactly how many "sickness" excuses are valid, and if invalid what actual reasons for absence they cloak. Armed with the facts expected to be forthcoming from this survey, the committee studying the results expects to improve conditions within this plant.

A NEW approach is being made in Detroit to improve plant morale, developed by the Industrial Incentive Division of the Navy and the Industrial Service Department of the Army. Uniformed personnel is being sent into the plants to talk to the men, individually and collectively.

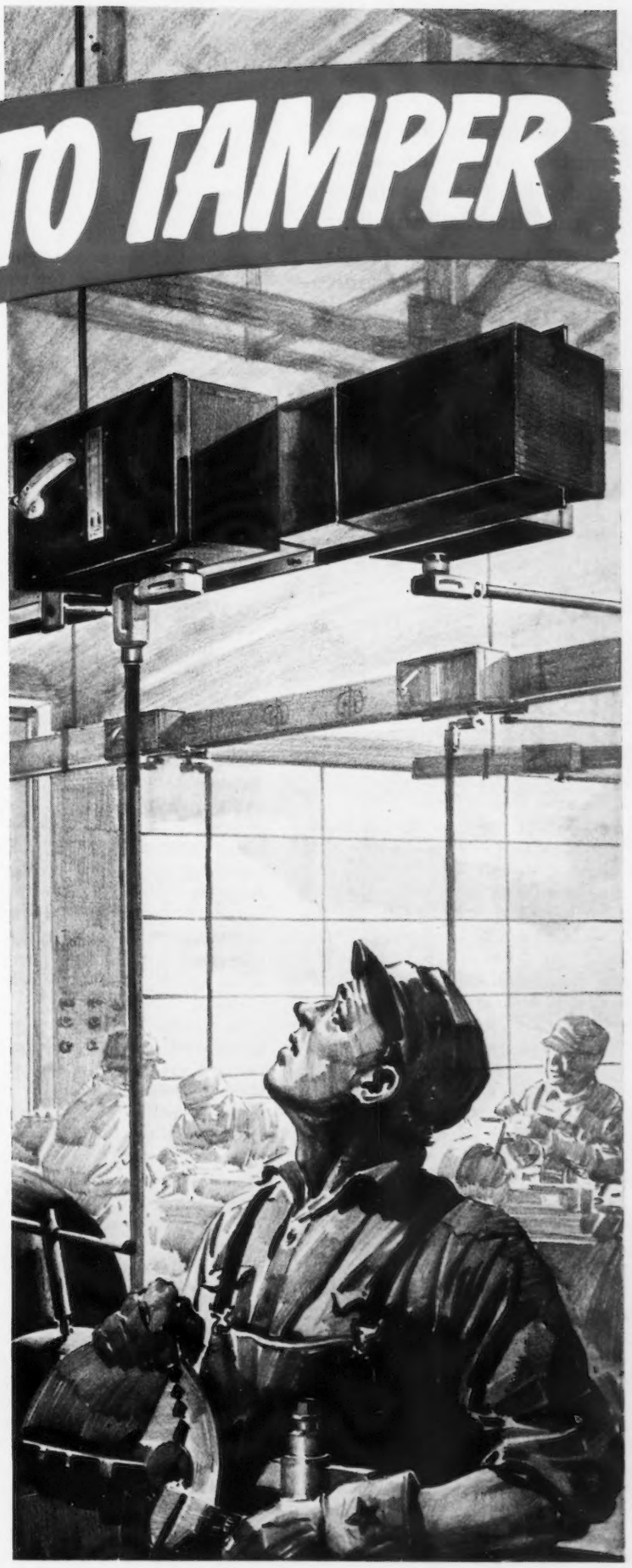
For example, the Navy began its Detroit drive last week at the Naval Gun Arsenal with a visit from Lt. Com. L. H. Brendel, of the Industrial Incentive Division, and Marine Lieut. Edward Butler, on shore duty this month after field activity on Guadalcanal.

This pair came into the arsenal, operated by Hudson, at the start of the working day and circulated steadily through the plant until noon, meeting workers at their machines, shaking hands and briefly talking with them about the need for continued and improved production. Early in the afternoon they spoke over the public address system of the plant for five minutes, and spent the rest of the day circulating through the shops again.

Such plant trips by uniformed personnel appear to be becoming a definite part of service policy. The objective, naturally, is to impress on the worker the fact that he is a civilian soldier, and that his work bears close relationship with battlefield success.

TOUGH TO TAMPER

. . . with Bus Duct



Out of the reach of meddlers and careless workmen—well protected against sabotage—are the Bus Duct lines that distribute light and power in thoroughly modern plants.

Current-carrying bus bars are enclosed *on all four sides* by a strong, rigid casing. Even the "plug-in" openings are capped when not in use.

Here is *maximum* protection of property and human life — with *minimum* use of critical materials, consistent with sound engineering.

Even more important, however, are the contributions Bus Duct is making to *production continuity* in the war emergency. Machines can be moved, tool set-ups changed, new circuits added—without cutting power or interrupting work.

"Plug-in" Bus Duct systems are today recognized as an integral part of the machine tools they serve.

In thousands of plants today, they are speeding war-time output. They will be a mass production *necessity* in post-war manufacture.

BUY MORE WAR BONDS • SALVAGE ALL SCRAP METAL

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Washington . . .

• Truman Senate Committee report on steel should have a wholesome effect, stimulating morale . . . "Monopolistic Control" theory seen absurd and contradicting other parts of committee's report.

WASHINGTON — The Truman Committee report on steel naturally had its critics but on the whole was accepted as being a constructive job. There were those in the steel industry who treated the report lightly and described it as being "innocuous enough." Others, passing upon only a section of a report, assailed it as a political document. They had in mind that portion given over to a tirade about domination of the war steel program by eight companies, and this criticism, it may be added, came from representatives of small companies. But this harangue was a minor part of the report that receded to relative unimportance when measured against the broad and objective background of the entire report. Hence, the general commendation that the report received.

The report should have a wholesome effect. Perhaps the most outstanding benefit will be to stimulate public morale. This because, unlike such a stodgy and ludicrous report as recently emanated from the House Boykin Committee, the Truman findings told all about steel supplies and took comfort in doing so. The Senate Committee is apparently more than willing that the Axis know that "The present prospects for overall ingot tonnage may . . . be viewed without undue alarm although not with complacency." The Senate Committee's calm was in striking contrast with the jittery tone of the House Committee. The Boykin group, politically bent on plastering the country with high cost, low-producing sponge iron plants, in its report shrieked that "The magnitude of this (steel) shortage is so serious that any public statement of the actual figures is impossible at this time, for such information would be of real aid to the enemy."

THE Truman Committee makes numerous sound recommendations. Many of these recommendations already were being carried out by industry with the assistance of the WPB Steel Division, whose head, H. G. Batcheller, was given an affectionate pat by the committee. This approval of Mr. Batcheller's administration is widely shared in the trade. It can be said also that considering the tremendous and unprecedented task of organization, predecessors of Mr. Batcheller deserve credit for their pioneering efforts.

Among the more important recommendations made were:

That the Steel Division be given authority to issue directives to the Salvage Division. The latter is charged with scrap collection. The committee is not satisfied with the scrap collection program and described it as having "proceeded haphazardly." Under the "ultimate control" of the Steel Division the committee thinks and finds general concurrence in its view that the program would operate better if centralized.

In warime, supplies are pressingly paramount and the importance of prices shrinks by comparison. Hence there is likewise agreement with committee recommendation that the Steel Division be given authority to insist that OPA fix scrap prices high enough to induce the scrap dealer to gather all the old material possible. The committee said that scrap prices are too low to enable the dealer to take new measures to recover remote scrap. The committee backed its suggestion for centralizing authority by picturing the plight of the scrap dealers with respect to labor shortage, complicated regulations on the use of equipment, stringent specifications, government red tape and other troubles.

THE committee raised an important point when it recommended that centrifugal castings and pressure castings should be used more freely as a substitute for forgings and rolled bars. This is going to be a matter of consumer education and the committee contributed to this end when it said that new equipment for such production can be built quickly and with much less critical material than rolling and forging facilities.

The committee report was not enthusiastic over sponge iron, but went lightly on the subject, perhaps out of regard for the sponge iron predilections of certain members of the committee. Though the report said that it is not entirely clear that any of the sponge iron processes will prove successful for large scale operations, WPB was criticised for not experimenting with some processes "that offered promise." The committee called for a halt of "theoretical discussions and attempts to obtain the opinions of scientific authorities" and an end to the controversy. The suggested remedy was approval by WPB of a low grade ore process. The committee declared that the Warren, Ohio, 100-ton plant of the Republic Steel Corp. "would not, even if successful, prove the general utility of sponge iron processes for other ores." It was pointed out the Republic plant is using high grade magnetite ore which is not common in the

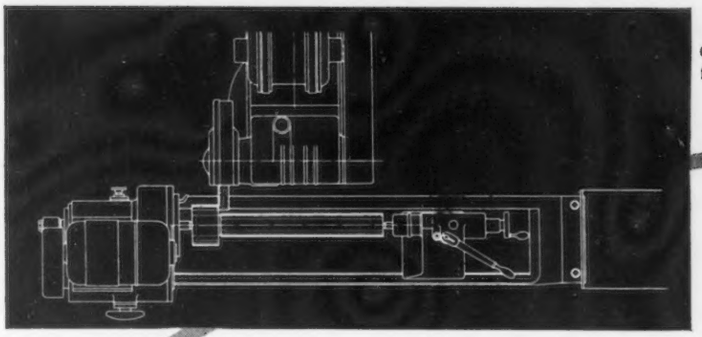
5.8 Miles Per Day, Pipe for New Line

Washington

• • • Production of "big inch" pipe for the Eastern portion of the Texas-East Coast oil pipeline at the National Tube Co.'s Lorain, Ohio, works is at the record pace of 5.8 miles a day, this United States Steel Corp. subsidiary has reported to the Petroleum Administration for War.

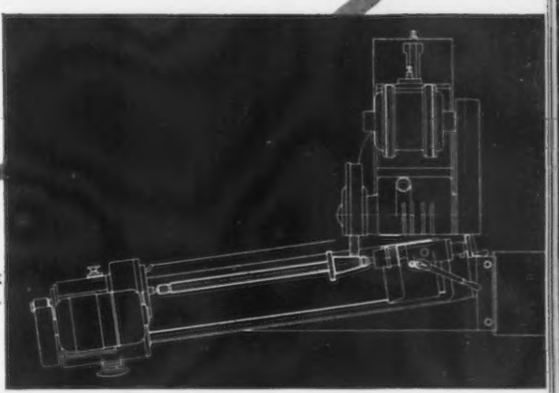
Having completed delivery of pipe for the Western portion of the line being built by War Emergency Pipe Lines, Inc., in exactly four months from the time production began, National Tube immediately started turning out the main-line material to complete the Eastern segment of the project.

On the Eastern section, 230 mi. of 1894 carloads of pipe, had been produced and delivered by Jan. 21. Since July 10, 1942, when initial work on the line was begun, more than 6400 carloads of pipe have been delivered.



Conventional cylindrical grinding set-up, followed by grinding the shoulder.

WIDE VARIETY OF PRECISION WORK *Quickly Set Up and Finished* ON CINCINNATI HYDRAULIC UNIVERSAL GRINDERS

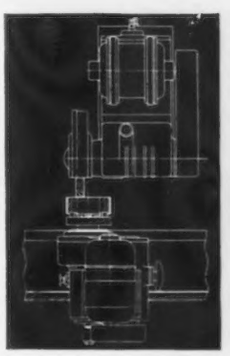


Set-up for grinding taper shank end of a milling machine arbor.

● Of the many factors to consider in the selection of a universal grinder, these two should receive first consideration: (1) how large a variety of work will the machine handle, (2) how fast can the work be accurately finished, including set-up time. An indication of the way in which CINCINNATI Hydraulic Universal Grinding Machines fulfill these requirements has been presented in the small illustrations on these two pages.

First of all, the CINCINNATI machine readily handles three basic types of precision tool-room grinding; cylindrical, internal, and rotary surface. Of course, many variations of these three classifications of work, such as steep tapers, may also be ground on the CINCINNATI. The second factor, set-up time, is exceptionally low for all types of work. For example, the internal grinding attachment may be set to grinding position by merely swinging it down and tightening one bolt.

All these features and many more are presented in catalogs which may be obtained on request: No. G-486 for the 12″ machine and G-474-1 for the 14″, 16″, and 18″ machines.



Left: Rotary surface grinding a part held in the standard chuck.

Above: Grinding the bore of a sleeve.

Above: CINCINNATI 12″ x 24″ Hydraulic Universal Grinding Machine.

CINCINNATI

CINCINNATI GRINDERS INCORPORATED CINCINNATI, OHIO, U.S.A.

MACHINES . . . CENTERTYPE GRINDING MACHINES . . . CENTERLESS GRINDING MACHINES . . . CENTERLESS LAPPING MACHINES

great bodies of iron ore found in the United States.

"Sponge iron experiments cannot be expected to produce any substantial quantities of substitute scrap in 1943, even if wholly successful," the report said. It concluded that the most that could be expected from sponge iron development would be volume production in 1944 or 1945.

The committee's bite on big steel being a popular political practice was to be expected but it really is no more serious than the usual political bark at $1 a year men. The committee in its attack on "big steel" took in an unusual amount of territory. It opened fire on eight steel companies for "their stranglehold on the entire industry." These companies, so said the committee, "are still reluctant to adopt new melting practices or to adapt themselves to varying conditions of scrap and ore supply." It further charges that they retard efforts to "develop the industry along new lines and in new areas."

THESE are unique points. The idea of so many as eight companies in a great volume industry like steel having monopolistic control is absurd. The very number of companies in this category itself implies competition. The great automobile industry has its great three and is there any economist, outside of impossible crackpots, who will say there was not the keenest competition in this industry? The charges of not adopting progressive practices and of retarding new lines and new areas likewise are equally as ridiculous as a cursory observation will show. It is also impossible to reconcile these accusations with the committee's flattering expression at another point in the report relating to difficulties of rapid expansion that "only a well organized and vigorous industry could do this job."

The blast that big companies got the lion's share of expansion also would seem to run counter to the committee's observation, intentional or otherwise, that the big companies' expansion "balanced facilities." Independent engineers have expressed the view that rapid expansion could not have been achieved in any other way.

This was made clear in the first Hauck report on expansion. This method, he pointed out, involves installing new facilities in with old facilities in the same plant and results in "scrambled facilities."

Advantages were set forth by Mr. Hauck and have proven themselves by actual construction of new capacity. These advantages were listed as follows: Earlier start in production; more efficient operations; less steel consumed in construction of plant; lower cost of facilities; experienced management and plant personnel; available and flexible working capital and higher economic value after the emergency.

Baruch Group Weighs World Ordnance Need

• • • Bernard M. Baruch and six other outstanding business executives have undertaken a survey to determine how industrial experience may further contribute to the worldwide supply and maintenance of army ordnance equipment.

All the members of the group and their representatives will provide for their own expenses during the survey, which was undertaken at the request of the War Department.

Shortage of Phenol Brings Plea for Facilities

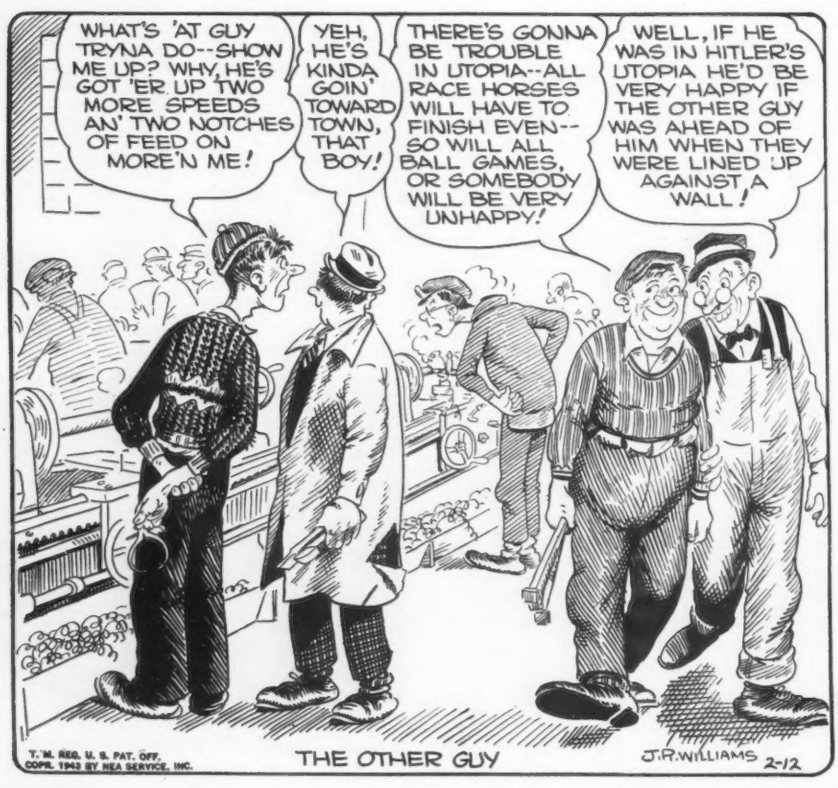
• • • Members of the thermosetting plastic processors industry advisory committee blamed shortages of phenol or phenolic materials as causing one of several production problems in their industry at a recent meeting in Washington with members of the WPB and the armed services.

Lack of availability of phenol or one of the phenolic materials has made it difficult for the industry to maintain production, members said. This difficulty has been accentuated by the fact that a majority of the available phenol has been placed in the resin producers' hands during the latter part of each month rather than distributed uniformly throughout the month for which allocations are made. To solve this problem, members urged that the Chemicals Division of WPB expedite the building of new phenol producing facilities already under way.

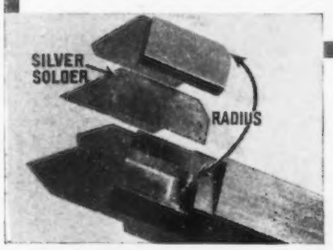
Some of the manufacturers of materials built with resins based on cresol and cresylic acid reported progress in substituting phenol for a portion of their production that previously involved these critical materials.

Members pointed out that in certain processes a portion of the phenolic material employed deteriorates over a period of time to the point where it is no longer satisfactory for its original use. It was agreed that, rather than waste the material involved in these instances, arrangements should be made to allocate such material for less critical usages.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

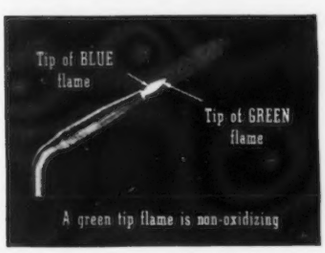

WHAT'S 'AT GUY TRYNA DO--SHOW ME UP? WHY, HE'S GOT 'ER UP TWO MORE SPEEDS AN' TWO NOTCHES OF FEED ON MORE'N ME!
YEH, HE'S KINDA GOIN' TOWARD TOWN, THAT BOY!
THERE'S GONNA BE TROUBLE IN UTOPIA--ALL RACE HORSES WILL HAVE TO FINISH EVEN--SO WILL ALL BALL GAMES, OR SOMEBODY WILL BE VERY UNHAPPY!
WELL, IF HE WAS IN HITLER'S UTOPIA HE'D BE VERY HAPPY IF THE OTHER GUY WAS AHEAD OF HIM WHEN THEY WERE LINED UP AGAINST A WALL!
T. M. REG. U. S. PAT. OFF. COPR. 1943 BY NEA SERVICE, INC.
THE OTHER GUY
J.R.WILLIAMS 2-12

How to Torch-braze Carbide Tips to Shanks and Get Tools on the Job *FAST*



1 After milling and grinding shank angles, mill recess in shank to fit carbide tips. Cut silver solder sheet (.003 thick) slightly larger than recess. Clean tip, sheet and recess with carbon tetrachloride.

2 Place shank in vise as shown. Apply flux liberally to shank recess and well back of recess. Flux silver solder sheet; place in recess. Flux carbide tip; place in recess. Assembly now ready for brazing.



3 Adjust oxy-acetylene torch to 10 lbs. pressure on both gages, with a tip of green flame and blue flame as shown.

4 Apply torch along bottom. Keep moving. Then work around sides and end of shank. Avoid excessive, or spotty, heating.

To get carbide tools on the job fast, many plants maintain an active stock of standard Carboloy Cemented Carbide tips—ready for brazing to shanks. In this way, carbide tools can be made available for most jobs within an hour after the need arises. Saves weeks—often months—of time—particularly on non-standard, made-to-order type of carbide tools. For this work you need simply an oxy-acetylene torch, and a few brazing accessories including flux, silver solder sheet or rod, etc. Procedure is simple, fast and efficient. Technique quickly acquired, even by inexperienced personnel. Carboloy Training Film available at $3.50 for fast instruction.

★ ★ ★ ★

Large Standard Tools in Stock for Heavy Work

A range of large size standard tools suitable for heavy cast iron and steel cutting work on boring mills, lathes, etc., are now in stock (1-13-43) available for immediate deliveries. In standard styles Nos. 4 and 7 (right and left hand straight turning) and Nos. 13 and 14 (15° side cutting-edge angle, left and right hand turning). Sizes 1½" square and 1½" x 2". Grade 44A for cast iron; 78B for steel.

Standard-Design Carboloy Tools for Cutting Off to Hollow Cores

Following an analysis of thousands of cut-off tools ordered in the past, standardized designs have been established for tools of this type. These cut-off tools are easy to order, speed up deliveries and eliminate special drawings. Standard-design Carboloy cut-off tools are designed for cutting off to hollow cores, such as on shell forgings, etc. Write for catalog GT-142.

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5 When solder melts and shank and tip become dull cherry red, direct flame on the tip. Don't allow solder to become so "watery" that it all runs out from under the tip.

6 Then take a holding rod and move tip back and forth to wipe in joint and distribute silver solder evenly. Make certain that the solder works up around the two enclosed sides of the tip.

7 Now remove flame and press down squarely on tip. Heavy pressure not needed. Hold until silver solder sets.

8 Set tool aside and allow to cool naturally. *Do not quench* in liquids as tip may crack.

CARBOLOY CEMENTED CARBIDES

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TOOLS • DIES • DRESSERS • CORE BITS • MASONRY DRILLS • WEAR RESISTANT PARTS

WEST COAST . . .

• Housing shortage breeds trouble for Coast boom cities . . . Local residents lured to war work . . . Lockheed tries boy-power . . . Unions claim Douglas Aircraft toppled at last.

SAN FRANCISCO — Wartime prosperity has kept the cash registers jingling in Pacific Coast business houses not directly connected with the sprawling military mushroom industries, but it has presented serious sociological problems which threaten to have repercussions in production.

The Number One problem—housing for migrant war workers—has spawned a host of troubles, trivial in themselves, but together constituting a continual headache for law enforcement agencies and social workers. With employment schedules projected far into the future, it became apparent well over a year ago that existing housing and emergency crackerbox construction would not be able to provide shelter for the host of newcomers, but not until about six or eight months ago did the shoe really begin to pinch in most Coast war centers. Although symptoms have been gradually becoming more apparent, the full force of the housing crisis struck the average civilian almost as much by surprise as the outbreak of war.

San Francisco, by reason of its peculiar geographical location at the tip of a hilly peninsula, had less increase in population over the past decade than other coast cities with room to spread out, notably Los Angeles. Hiring of workers to carry out contracts which by the end of last year had put more than three out of every four industrial workers in the city in shipbuilders' clothes, found the city practically without accommodations, temporary or otherwise. While the prevalence of "hot beds" (three occupants, in shifts) probably has been over-rated, much of the city's added population necessarily has had to be taken care of through more efficient use of existing quarters.

Although the city by the Golden Gate has never been particularly prudish, the lusty life typified by the Barbary Coast long has been a thing of the past, and the sombreros of the pioneers had transformed to top hats in the third generation. When the city's Japanese population, some 5000 strong, was evacuated from a concentrated area which had been quiet and law abiding, most people took it for granted that the void would be filled by war workers equally respecting of the common peace. No one dreamed that less than a year later the same section would become a nest of violence, robbery and rape where it is taken for granted that policemen patrol in pairs. The former homes of the Japanese now are occupied almost entirely by Negroes, nearly all of them new residents attracted to the city by the easy money and tolerance of the citizenry. A similar situation has occurred across San Francisco Bay, in Oakland and Emeryville, where a peaceful, law abiding Negro quarter populated chiefly by Pullman employees has been swollen by new residents with too much money to spend. A reliable federal official states that practically all crimes of violence now are traced to newcomers. Some of these people are engaged in war industry, but a camp following of gamblers, petty crooks and floaters accounts for most of the trouble.

In Los Angeles a somewhat similar problem is caused by young Mexicans and a few Negroes of the zoot suit type who operate in gangs and engage in hoodlum tactics, loose living and petty violence as well as thievery.

THE class of white people drawn to war jobs on the coast, unfortunately, has been little better than the others. Unlike the big Midwest war plants, which have been able to draw on a broad, relatively prosperous farm area, the coast has had to draw its workers from afar, and has gained all too high a proportion of neer-do-wells from the industrial dust bowls of the Far East, with a good proportion of low grade agricultural workers from the deep South. Complicating the situation has been the constant flow of military personnel, operating from coast harbors, or embarking for points west, bringing with them wives, sweethearts and families with little coin in their slacks but temptation in their hearts.

NEW LIFE-RAFT INFLATER: Carrier based fighter pilots forced down at sea now find a completely equipped, fully inflated rubber boat waiting for them when they climb from the crashed plane before it sinks. The new device, developed by engineers of Walter Kidde & Co., employs a water-sensitive switch on the underside of the fuselage, which automatically opens the release valves on two cylinders of carbon dioxide. Gas from these cylinders opens the hatches and inflates the raft.

To prove to the OPA that the city had outgrown food rations based on the 1940 census, San Francisco air raid wardens last November engaged in a house to house count. The tabulation showed that the 49 square miles in the city proper, which constitutes only a small proportion of the industrial area, had grwn from 634,536 in 1940 to 728,236. Percentage wise, this does not hold a candle to the cities of the Northwest—Portland, Vancouver, Tacoma and Seattle —nor to southern California but these centers have had space to spread out. Nevertheless, one section of San Francisco showed a population gain of 86 per cent, while the more heavily populated portions ranged from 16 to 22 per cent increase, as against a 15 per cent gain for the city as a whole.

The federal government, through

FOSDICK

JIG BORER

● **Fosdick Jig Borers because of their extreme versatility are handling heavy production schedules in some war plants and operating with equal efficiency on small lots in others.**

Here's a medium priced machine tool that is being used successfully on a variety of operations and does not require expensive jigs or fixtures. In many instances comparatively unskilled help is maintaining high production and close tolerances on several different jobs.

This specific operation calls for the boring of 4 piercing holes in a steel stamping die and is held to very close limits. It is typical of the type of work being universally handled on Fosdick Jig Borers.

WRITE

for Jig Borer bulletin J. B. A. for complete details.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI ··· OHIO

apartment house owners and property and real estate firms, now has made a careful check of vacancies in family units which turned up only 200 empties. This agency of the Federal Government, working on a decentralization program, had hoped to bring in 400 additional stenographic and office workers, but were balked by the saturation. A similar sardine-pack occurs at other coast industrial centers, possibly worse at Portland and San Diego.

TO meet increasing demands for workers, industrial plants have been carrying on concerted drives to recruit members of employees' families as well as persons engaged in other pursuits already living in the community. No medium of public information has been overlooked in these recruiting efforts, with emphasis laid, ironically enough, upon the argument that shipbuilding and aircraft skills acquired during the war will be valuable to workers afterwards. Radio, 16 poster billboards, brochures, even street salesmen, have supplemented advertisements in the public press in luring men and women of all ages.

Most ambitious plan yet inaugurated to tap new unemployed segments of the local population was initiated last week by Lockheed and Vega, whose plants are cheek-and-jowl with the city of Burbank, suburban to Los Angeles. Personnel management succeeded in a dicker with boards of education by which 400 boys 16 and 17 years old will alternate four weeks of school with four weeks of airplane building in the Lockheed-Vega plants. School officials of Burbank and Pasadena, who are cooperating in the plan, are able to continue to hold high the torch of knowledge by means of a provision that the boys must keep up their grades to hold their jobs and must carry out the four by four plan, 12 months a year. Parental consent is necessary, and hiring is done only through the school system.

The boys will work on the day shift only, receiving 60 cents an hour to start with automatic raises every four weeks until 75 cents an hour is reached in the basic classification, which is considerably better than delivering groceries. Raises beyond the 75 cent point will be on the basis of merit, just like any other employee. Chartered buses will carry the boys to and from work, thus guaranteeing against their falling in with evil companions on the way.

In what may well be a move of desperation, AFL and CIO unions have filed with the National Labor Relations Board claims of representing a majority of Douglas Aircraft workers, and asked for an election for determination of bargaining agent. Alone of the aircraft manufacturers, Douglas never has been organized despite strong efforts on the part of both AFL and CIO. Now, with the War Labor Board about to announce a wage stabilization and job classification plan which will affect all southern California airframe manufacturers alike, it is a case of now or never, for once the stabilization is made, union benefits will fade.

The AFL International Association of Machinists filed its claim to represent employees of the Douglas El Segundo plant, not the choicest Douglas plum, which was challenged almost immediately by an intervening CIO petition to the board. The CIO then petitioned Douglas to accept it as bargaining agent at the company's main Santa Monica plant and that at Long Beach. If Douglas rejects this claim, the CIO may go to the NLRB to request an official determination.

A COMPARISON of plane production in the Los Angeles area with that of Germany and Japan was made last week on a weight basis, which gives extra force to bomber production and discounts trainers. Theodore C. Coleman, vice-president of Northrop Aircraft Co., Inc., gave the Los Angeles area credit for twice as many planes as Japan and more than Germany in 1942. Boosting the city's claim to be the "Detroit of aviation," Coleman declared that Los Angeles now is headquarters for firms who this year will produce a dollar volume of airplanes equal to the entire production of automobiles in the United States in 1940.

Release of California mineral production figures for 1942 clearly reflected the impact of war on the luxury minerals, gold and silver, and increased attention being given to the strategic. Gold production fell from $49,307,755 in 1941 to $29,785,000 last year. Tungsten and quicksilver both topped the million dollar mark. Total production of strategic minerals was $11,854,000. Even cement has passed gold on the list, with production totaling $36,822,000.

NAZI ORDNANCE INFERIOR: Exhaustive tests at the Aberdeen proving grounds using captured materiel show the vaunted Nazi guns to be far inferior to American weapons. In the left-hand photo are shown the American 90 mm., anti-tank, anti-aircraft gun (left) and the German 80 mm., used for the same purposes. In the right hand photo is pictured the American 105 mm. gun mounted on an armored tank-carriage. The gun's superiority over the Nazi 88 mm., already proved on African battlefields, was further confirmed.

Wide World

FREE TELL-ALL BOOKLETS... For SHEET-STEEL FABRICATORS

Many war products are being redesigned with sheet steels to conserve even more critical metals. Thousands of new men swarming into America's war industries need helpful, up-to-the-minute information.

To you men of new responsibilities, ARMCO offers informative booklets on coated and uncoated sheet metals. We want to help you turn out more and better war equipment. And we want you to remember these ARMCO *special-purpose* metals when you turn from war to peace-time products.

The free booklets described are offered only to men who work or intend to work with flat-rolled iron and steel and stainless steels. Please write on your company letterhead, naming the booklet or booklets you want. The American Rolling Mill Company, 591 Curtis Street, Middletown, Ohio.

STAINLESS STEEL FABRICATING

The booklet "How to Fabricate ARMCO Stainless Steels" is complete in every way. Contains fabricating data on cutting, drawing, annealing, welding, soldering, riveting, finishing and design. Also compares the physical properties of various metals.

PORCELAIN ENAMEL

Describes this non-critical finish for wartime applications. The booklet gives useful engineering data on porcelain enamel, explains physical properties, and tells about the job-enameling plants in the industry.

CHROMIUM-NICKEL STAINLESS

A 24-page booklet that interprets the uses and characteristics of the Chromium-Nickel grades of ARMCO Stainless. Includes corrosion resistance data of all kinds and tells average physical properties of each grade.

WORKABLE ZINC-COATED SHEETS

"Useful facts about ARMCO ZINCGRIP," a zinc-coated iron or steel that does not peel or flake when severely formed. Chock-full of valuable fabricating tips on deep drawing, roll and brake forming, welding, recoating joints, soldering and finishing.

PAINTABLE GALVANIZED SHEETS

Tells about the *original* galvanized bonderized sheet metal that takes and preserves paint. Reveals results of tests and describes in detail the recommended fabricating and finishing practices. There are special sections on welding.

HIGHLY REFINED IRON

"Where to Use ARMCO Ingot Iron . . . and Why." This highly-refined, durable iron is described in a 20-page booklet. Sets forth service records, explains the various grades and explains working of sheets and plates.

SPECIAL—FOR PIPE USERS

ARMCO Spiral Welded Pipe for industrial uses. Embraces complete data tables (including pressures) and tells how to save with prefabricated fittings that eliminate unnecessary joints. Contains flow charts.

★ ★ ★ ★

SPECIAL PURPOSE ARMCO SHEET METALS

THE AMERICAN ROLLING MILL COMPANY

Fatigue Cracks

BY A. H. DIX

Equilibrium in Eng. Comp.

Until a few semesters ago this university included in its English instruction staff two gentlemen named Cumming and Going. Fate listed them next to each other in the college catalogue. Appropriately, Mr. Cumming came first, with Ip English Comp., and immediately next to him, with Iq Eng. Comp., was Mr. Going.

—*H. F. Cotter, University of Alabama*

Hibernating Bear

• • • Which reminds us to mention that the flattest signature we have ever seen is that of U. O. Cumming, president of the International Service Corp., New York. Look:

Except for the wild oat ending, it might be a topographical map of Kansas or the cardiagraph of a hibernating bear.

Long Sleep

• • • Hibernate is what advertising ought to do for the duration, says Prof. Colston E. Warne of Amherst, in a letter to *Printers' Ink*, the advertising journal. He doesn't put it as baldly as that, but thinks the Treasury should regard advertising expenditures as a tax-deductible item of business expense only if the advertising is necessary to sell goods today.

We are not among those who think that when the priests in our temples of higher learning wander outside their specialized precincts they exhibit the mentality of a not especially bright 12-year-old child, and that businessmen as a class combine the best features of Alexander Hamilton, Nostradamus, and Alfred the Great. For the exact opposite is more often the case.

We are willing to grant, too, that few can discuss without heat any matter that intimately concerns their own bread and butter. We would not, for example, expect an unemotional approach from the Minsky brothers on the subject of the adagio strip's contribution to the war effort.

Nor are we willing to break a lance for advertising in all its departments, finding it difficult to play St. George for such an irritant, for example, as "*The best tunes of all move to Carnegie Hall.*"

Having demonstrated, by means of these three disclaimers, our own utter fairness, and admitting that we squawk as loud as the next one when our own ox is gored, we would like to ask the Professor if he is sure his mental biscuit was thoroughly baked when he took it from the oven. Let him consider, for instance, your favorite family journal and its fellows. True, we are but a drop in the vast ocean of advertising, but the Professor does not except us from his brake on advertising, and if he had his way P. R. Mallory might be deterred from telling you, as it did last week, "How to Dress Spot Welding Tips and Save Vital Raw Material."

Brown & Sharpe might not explain how to use cutters at each end of a No. 12 milling machine table and double output. The Detroit Universal Duplicator Co. might not show you how to increase production of certain machined war parts by 600 per cent. And Michigan Tool Co. might forego telling you the 15 ways of getting more out of your shaper cutters.

Has the Professor considered the consequences of discouraging the flow of this type of information to the war industries? If he has, does he conclude that its loss would be of small consequence? And if he arrived at that conclusion, did he do so, as a lover of the scientific approach, by means of field work. Or was it, to swipe a definition from *The Bee-Hive*, "*the drawing of a mathematically precise line from an unwarranted assumption to a foregone conclusion?*"

Our guess is that the Professor did little field work. If he would give us ten minutes we think we could convince him that his brainchild didn't complete the full period of gestation. We would not impose our own biased opinions on him, but would lay on his lap the stacks of unsolicited letters from the war industries, showing how heavily they lean on your favorite family journal.

We would ask him to lend an eye, too, to the investigation of reader interest in advertising pages that was conducted not by us or by any other publication but by the National Industrial Advertisers Assn. We would ask him to bear in mind that the subscriber contributes only a part of the money that goes to pay editors, printers, paper makers and the post office, and that without advertising revenue the article that showed makers of war goods how to get 20 times more output out of their lathe tools would never have seen the light of day.

Although the Professor is doubtless a sincere and honorable man, we think that in the present instance he has been reading too many liquor and cigarette ads, and perhaps unconsciously has been shielding his eyes and his mind from advertising's more radiant facets.

Aptronyms

Did you know that the Insto-Gas Corp., Detroit, has an H. F. Belcher?

—*George Ringstead, Adv. Mgr., Whitman & Barnes, Detroit*

A St. Louis salesman of railroad supplies is blessed with the name James B. Peddle.

—*Tom Ryan, St. Louis*

Mechanical Bouncer

Your Jan. 28 issue mentions a "carousal conveyor." In my book "carousal" is "a noisy drinking bout or revel." I predict a great future for it in the night club field—with hooks to affix to the collars of the fallen, in order to drag them from the battlefield of Bacchus.

—*Deac*

You and your ——— ——— education.

Cleft Palate Dept.

Among our Washington subscribers is J. F. Firth-Hand, of 908 G St., N.W. It would be nice if (1) your Washington listening post, Leon Wesley Moffett, could pick up some controversial piece of information from this gentleman, if (2) Moff could cultivate a lisp, and if (3) someone should ask, "Is this information hearsay?," so that he could answer, "No, it came to me firth hand."

Caterpillar Tank

On page 95 of the Jan. 21 you print an Office of War Information cartoon showing two fish beside a baited hook. One fish says to the other, "Don't touch it! He's supposed to be making tanks with the rest of the boys."

I am an old and experienced fisherman, but I can't identify the bait. What is it?

—*L. E. R.*

A caterpillar, of course.

Stopper

Nick Barlow's Daughter may run this Hydraulic Lathe.—Gisholt Machine Co.

Puzzles

The answer to last week's problem is 11,000. The regression equation, by least square method, is: Reported figure is 2.25 times actual plus 2000.

Buckeye Steel Castings Company's chief mechanical engineer, H. W. Stertzbach, takes the blame for this:

Given triangle a, b, c, with ab as 10 in., bc 11 in., ca 12 in. A, b and c are respectively centers of circles of radii 4 in., 3 in. and 5 in. Find radii of circles (8 of them) which are tangent to the three given circles. Graphic solution preferred.

Northern SUPER-CRANES

SERVE A WIDE RANGE OF

METAL and WAR INDUSTRIES

Northern Crane handles all material in the storage yard of this steel mill.

Northern Crane handling a variety of materials in steel mill storage.

Northern Crane in a Steel Warehouse.

MATERIALS HANDLING IS ONE JOB YOU CAN'T SUBCONTRACT

Northern Crane, magnet equipped, handling heavy scrap.

Northern Cranes are working 24 hours a day—7 days a week in hundreds of plants—with no repairs and no shutdowns.

War service is extremely severe, and the pace permits no time for "coddling" a crane. They have to take it—Northern Super-Cranes do.

Materials Handling is one job you can't subcontract. If any other machine breaks down, you can subcontract its work. But a crane breakdown ties up the shop. Crane reliability is absolutely essential.

NORTHERN ENGINEERING WORKS

General Office: **2613 Atwater St., DETROIT, MICH.**

NORTHERN CRANE & HOIST WORKS, Limited • WINDSOR, CANADA

Offices at—913 South 38th St., BIRMINGHAM • 53 West Jackson Blvd., CHICAGO • 2428 Spring Grove, CINCINNATI • 5724 Navigation Blvd., HOUSTON • 44 Whitehall St., NEW YORK • 555 Union Trust Bldg., PITTSBURGH • 4135 Gratiot Ave., ST. LOUIS • 1679 University Ave., ST. PAUL

Dear Editor:

"E" OMISSIONS

Sir:

We are pleased to be honored with the listing of two of our "E" awards in your Jan. 7 issue, page 69. As a matter of record, however, "E" awards were also received by our units at Bethlehem, Fore River, Staten Island, and San Pedro.

May I add that this omission does not dim for us the glory of the superb job of your Annual Issue.

JOHN C. LONG,
Manager of Publications
Bethlehem Steel Co.,
Bethlehem, Pa.

• Apologies to Bethlehem Steel, also to Autocar, Carnegie-Illinois, Cincinnati Milling & Grinding Machines, Inc., National Forge & Ordnance, National Supply, John A. Roebling & Sons, Wyckoff Drawn Steel, and others. Omissions were due to the fact that those companies which received the Navy "E" before the joint award was instituted, and were later raised to Army-Navy status, were not included in the lists sent us by Washington.—Ed.

FLYING AT THE SPEED OF SOUND

Sir:

The news item in your December 10 issue reads:

"Given the necessary incentive and the funds, the writer sees no reason why air speeds should not increase until they reach the velocity of sound at 740 miles per hour (1,080 feet per second)."

Mr. Editor, having thus fired our imaginations, can you tell us whether the engine noise of a pusher-machine, travelling at the speed of sound, would be heard by its pilot?

J. H. W. KERSTON
110 E. 42nd St.,
New York City

• Yes, as the relative speeds would be unaltered.—Ed.

BORON

Sir:

I would like to obtain, if possible, about four copies of your very interesting article on Boron.

We attended a war course on Metallurgy of iron and steel and we discussed Boron, but not much was known of it then.

LERON A. CHILD
Carnegie Illinois Steel Corp.,
Gary, Ind.

Sir:

Would you please send me two copies of the article "Boron" which appeared in the Nov. 19 issue. I note that reprints are available.

ROBERT F. WEBSTER
Ellwood City, Pa.

Sir:

We found your article on Boron to be of special interest. Would it be possible for you to supply us with six copies of this article for use in our offices?

EDWARD C. ROEHILL
Armco International Corp.,
Middletown, Ohio

Sir:

Will you please forward two copies of the article on Boron.

NEIL METCALF
Burlington Steel Co., Ltd.,
Hamilton, Canada

EDITORIAL BOOKLET

Sir:

Please send us a copy of the booklet of editorials by John H. Van Deventer. Enclosed is 25c in stamps to cover the cost.

WM. M. SIESEL,
General Manager
Lenoxite Div.,
Lenox, Ind.,
Trenton, N. J.

ABSENTEEISM VS. INEPT MANAGEMENT

A friend of mine helped erect the bridge in Washington State. The steel workers said it would never stay up. It didn't.

The Normandie rolled over through careless management. Metallurgists and engineers laid out a sheet mill with a number of stands two blocks long. It did not work. A workman disconnected the electric controls one night and operated one stand and believe it or not it worked. The rest is standing idle.

With German, English, and Russian tanks as models, a tank with the big gun on the side was designed and hundreds were built. It was a failure. Who was to blame—the mechanic who laid off half a day?

With German, English and Russian planes as models, we built a lot of fighter planes that were not so hot. More time and material wasted. If we are as clever as we boast, we should have built ones twice as good anyway. No workman laying off work was to blame.

There is today a propaganda against American workmen by the press and technical journals. It is more bitter than any against the nasties or the Japs. After the war it will be worse. The ship that fell apart at the dock—the planes that fall apart in the sky—someone is to blame and the workman who takes a day off is not.

Rome and Greece were great as long as they honored the men who won their wars, built their cities, and carved their statues. As soon as they tried to steal their glory and belittle them that was the end.

J. MORGAN
Chicago

CREEP STRENGTH

Sir:

In your Nov. 26, 1942, issue, there is an article on the creep strength of steels, referring to the investigations of a German metallurgist, as recorded in *Stahl und Eisen.*

How may we procure copies of such articles which occur from time to time and appear to be of considerable interest?

N. J. FINSTERWALDER,
Chief Metallurgist
Taylor Instrument Companies,
Rochester, N. Y.

• The brief item we published came from England. The English seem to be the only ones able to obtain German technical publications. We have not yet been able to find a means of obtaining them here.—Ed.

NITRIDING

Sir:

Can you assist us in obtaining information regarding the process of nitriding for which we have inquiries from the Maintenance Division of the Department of Aircraft Production, Melbourne, Australia?

ALFRED MEALAND,
Director, Machine Tools Div.
Commonwealth of Australia,
War Supplies Procurement,
New York City

• THE IRON AGE has published considerable information on nitriding, but for complete data we suggest you get in touch with the Nitralloy Corp., 230 Park Ave., New York.—Ed.

HAIR-LINE CRACKS

Sir:

Could you give me the exact reference to the article on page 35 of your Dec. 31 issue, "Formation of Hair-Line Cracks"?

We readers appreciate your printing these reviews soon after the articles are written but believe it is always worth while to give the complete reference of the article.

R. E. CRAMER,
Asst. Professor of
Engineering Materials
University of Illinois,
Urbana, Ill.

• This item came to us through an English source and we have no information regarding its origin.—Ed.

HISTORY OF WELDING

Sir:

I am interested in securing a history of welding, including electric, acetylene, etc. Can you tell me of any books or magazine articles published along this line?

W. E. SHEFELTON,
Production Manager
R. D. Cole Mfg. Co.,
Newnan, Ga.

• We know of no books on the history of welding, nor does the American Welding Society. Some historical references can be found in the book, "Electric Welding," by Ethan Viall, published by McGraw-Hill Book Co., 330 West 42nd St., New York; price $4.—Ed.

GRINDERS
LATHE
MILLING
OPERATORS
ALSO
Draft Exempt Men
Who have some mechanical ability.
Hourly rate, plus overtime.
58 Hours Week
WAR WORK
If now on war work
do not apply.

Women Welcomed!

No, the young woman at the lathe is not a "glamour-girl," especially selected because she is photogenic. She's an honest-to-goodness worker on a Monarch lathe, doing war production work. She never saw the inside of a machine shop before she was hired, but in a few weeks she was turning out a good day's work of precision parts, accurately and on schedule.

Part of her success, and that of the thousands of women now in war work, lies in careful selection, adequate training and helpful supervision. Part of it also—at least for those women who work on Monarch lathes—is due to the ease of operation, the precautions taken to lessen fatigue, and the accuracy and dependability built into Monarchs.

For the vast majority of turning work done on Monarchs, you can welcome women at your employment office and in your plant. The substitution of "woman-hours" for man-hours will effectively help give you more machine-hours. If you'd like some firsthand information on the subject, send for the booklet "Women in Production Work." It's yours for the asking.

THE MONARCH MACHINE TOOL COMPANY
SIDNEY • • • OHIO

MONARCH LATHES *Cover the Turning Field*

This Industrial Week . . .

- ***Wage Boost Question Foremost Problem***
- ***WPB Dispute Won't Cause Loss of the War***
- ***Blanket Raise in Ore Prices Unlikely***
- ***Steel for Munitions May Be Reallocated***
- ***Ingot Rate Unchanged at 99 Per Cent***

THE wage increase problem occupies the main stage this week, with the War Production Board's jurisdictional dispute at Washington and several price developments drawing their share of attention from the metals and metalworking industries.

Apprehension already is being expressed in some quarters over a possible bituminous coal strike April 1, and speculation has arisen over whether the CIO might move to reopen its contracts with leading steel companies following indications of union dissatisfaction with the "Little Steel" wage stabilization policy allowing 15 per cent pay increases between Jan. 1, 1941, and May 1, 1942.

The vulnerable spot in the coal situation would be Western Pennsylvania and Ohio blast furnaces which depend wholly on beehive coke supplies for fuel. About 15 per cent of the total pig iron production in the Pittsburgh area is dependent upon beehive coke supplies. With today's high rate of steel output, even a short interruption at the mines would be dangerous.

A direct push by high union officials toward revising steel industry wage contracts is not likely right at this time, in the opinion of informed observers, but agitation by local unionists can be expected. At the proper time, after pressure has developed from the bottom and demands have been publicized by local unions, top unionists usually can be depended upon to take the action which they have long expected to take.

ON the front at Washington, D. C., the recent jurisdictional differences between WPB Program vice-chairman Ferdinand Eberstadt and Charles E. Wilson, production vice-chairman of WPB, do not threaten to split WPB in half, won't "lose the war," nor be the immediate cause of either of the two competent men resigning. The new Controlled Materials Plan, amplified by several important new regulations this week, is expected to remain unchanged basically. It is hoped at Washington that Mr. Wilson and Mr. Eberstadt, once having had their differences composed, may form an effective working team.

At the same time that WPB divisions were being transferred to Mr. Wilson, manufacturers, suppliers and certain WPB officials were struggling to place orders for critical components, as mentioned last week. The necessity for setting up advance estimates within a short space of time proved a heavy burden on some executives, who at the same time appreciated the need, long overdue, for straightening out the situation surrounding critical parts, lack of which often prevented war equipment from entering service promptly.

In the end, the move on components may put steel companies and other suppliers in a better position to assist in producing necessary materials.

THE third trend of the past week was actions and discussions concerning prices of various raw materials. For several months, little of importance in this direction has occurred, but now more activity is noted. OPA has raised bituminous coal prices in several new regions in varying amounts to allow for the changeover to the six-day week and increased operating costs. Discussions are underway concerning several extra charges on certain kinds of steel and also upon pig iron prices in at least one area.

Connellsville beehive furnace coke prices have been raised 50c. per ton by OPA, effective Feb. 3, after a survey of 60 plants. This will help the oven operators to absorb the increased cost of coal, but it will not remove the threat of an unbalance in the aggregate supply of beehive coke, which arises principally from the manpower problem, particularly at the smaller, marginal units.

Much interest centers upon Lake Superior iron ore prices, customarily established at about this time of year in advance of the formal opening of the navigation season. It is believed that OPA will resist any blanket increase in ore quotations despite the fact mining companies are pressing for relief to help meet increased costs. However, average prices paid for iron ore in 1943 may be slightly higher because of the fact that new mines can charge more. Last year, iron

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ore prices were frozen at existing levels, in contrast to steel prices where a maximum was set which enabled steel previously sold below the ceiling to command the ceiling.

Last week the 14 claimant agencies under CMP were given their cuts of copper, steel and aluminum for the second quarter. Requests for carbon steel were reduced 17 per cent, alloy steel 15 per cent, copper 16 per cent and aluminum 14 per cent to bring demand in line with supply. Some of the less important war requirements were curtailed severely.

IT is understood that in second quarter the manufacture of steel shell cases will be increased. Heavy purchases have been made recently of trimmers, drawers and heading equipment for producing the steel cases.

It has been learned that integration committees composed of representatives of munitions and component manufacturers are studying the movement of steel going into munitions-making with a view toward eliminating cross-hauling. These committees are expected to recommend where necessary the reallocation of munitions steel orders including bombs to geographical areas best suited from the standpoint of manufacturing and finishing operations. Final action on such recommendations if presented would be taken by WPB and could result possibly in a considerable shift in current manufacturing and finishing programs.

Some of the claimant agency requests were based almost entirely on estimates derived from data received in the middle of 1942.

New regulations amplifying CMP at long last began to come out at a faster clip this week. Regulation No. 4 governing warehouse sales of the three materials, aluminum, copper and steel, has been eagerly awaited by jobbers over the nation. The amended version of CMP regulation No. 1 was issued on Monday of this week, followed on Tuesday by regulation No. 3 pertaining to the use of preference rating under CMP.

As the total number of programs for which accounting will be required has been reduced, by agreement with the CMP claimant agencies, to substantially less than 100, internal bookkeeping of users of controlled materials is expected to be simplified.

Steel ingot output in January reported by the Iron and Steel Institute at 7,408,744 net tons set a record for the month, and crowded near the all-time peak established last October. Chances of continued gains in the early months of the current year are considered good.

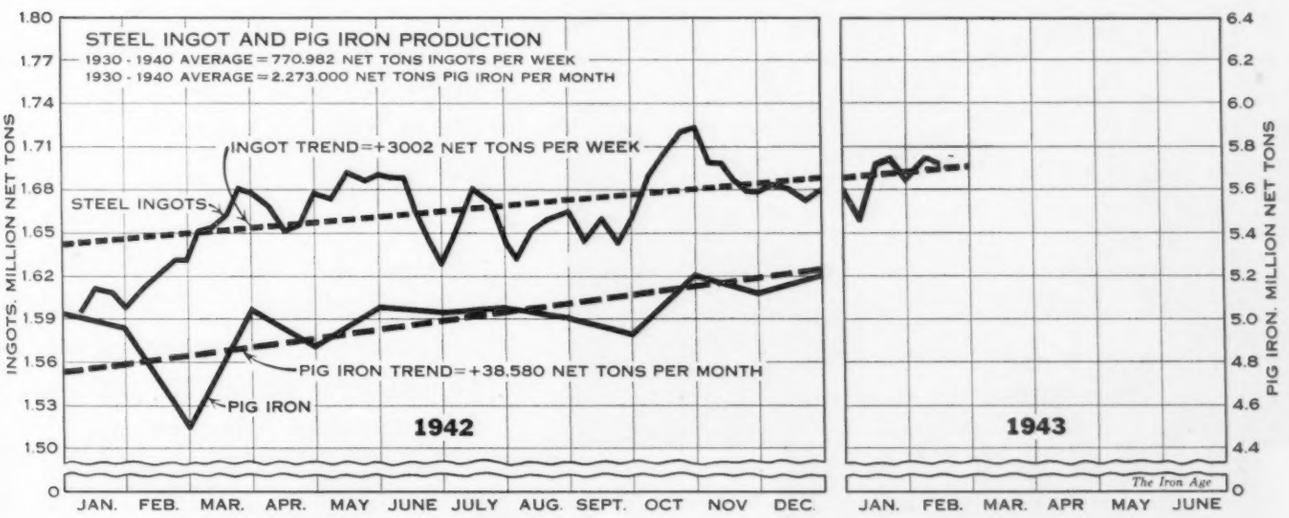
FOR the third successive week, national steel ingot production remains unchanged at 99 per cent of capacity. Pittsburgh operations are up one point to 101.5 per cent. Youngstown also is up one point to 102 per cent. The rate at Cleveland is up one and a half points to 96 per cent; steelmaking at Philadelphia is off half a point to 92 per cent. Detroit schedules fell one and a half points to 102 per cent. Operations in the Eastern Area declined six points to 94 per cent. Ingot rates continued at last week's levels in Chicago at 100 per cent; Buffalo at 104.5 per cent; Wheeling 90 per cent; Birmingham 102 per cent; Cincinnati 100 per cent and St. Louis 106.5 per cent.

Jack & Heintz Acquires Its Fourth Vacation Spot

Cleveland

• • • Another vacation spot, Honeymoon Isle, Florida, has been leased by the Jack & Heintz Co. for its "associates" (employees). The island spot, three miles from Clearwater in the Gulf of Mexico, has 50 palm-thatched cottages for two, a commissary, and a community house. The associates, beginning March 8, will go at the rate of five couples a day until the cottages are filled. They will be away two weeks.

Honeymoon Isle is the third Florida vacation-land for Jahco employees, with a fourth being an island in Canada. The other Florida vacation lands are at Ft. Lauderdale and Hollywood, on the east coast.



Steel Ingot Production by Districts Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
February 4	100.5	100.0	101.0	92.5	95.5	104.5	90.0	102.0	103.5*	100.0	102.0	106.5	100.0	99.5
February 11	101.5	100.0	102.0	92.0	97.0	104.5	90.0	102.0	102.0	100.0	102.0	106.5	94.0	99.5

* Revised

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MILLING CUTTERS • GROUND FORM TOOLS • SPECIAL TOOLS

ABSENTEEISM

Morale Education Seen As Best National Solution

• • • **Boiling down** the underlying causes and means of correction of absenteeism has proved a tough job for industry, the War Manpower Commission and private observers, because no common ground between all occurrences could be traced. More than a dozen causes and as many remedies have been turned up.

Is lowered morale in the work force responsible? Has the cream of industrial personnel been taken by the draft? Are the real facts less disturbing than current publicity would lead you to believe?

THE IRON AGE survey of the problem with these questions in mind is presented below in a series of reports from key industrial centers. Throughout these reports may be found the numerous causes discovered and the most effective remedies. The box score of the entire survey points to the lack of an endeavor linking nearly all industries on a common ground. That link is the need for morale-education for workers . . . that training which convinces each worker that his effort and production is vital to freedom. That the problem is not underrated is shown by the fact that every major labor facility in the nation is hunting its solution.

Steel Plant Absentees Termed Few

Chicago

• • • **The experiences** of local metal working plants with absenteeism have been mixed, a survey by THE IRON AGE indicates. Some plants have been hard hit, with the rate of absenteeism ranging up to as high as 10 per cent, while other plants, including a large aircraft company, reported as little as 2 per cent.

There does not appear to be any common ground linking specific industries with specific rates of absences except that extensive overtime pay, which in turn reflects long hours, was a common denominator for a majority of the plants having high absentee rates. Several plants operating on swing shifts, 7 days a week, in which no overtime was paid, reported a very low rate.

Opinions as to the causes of absenteeism varied considerably. The high wages being received by young boys and girls just out of high school and by people who had not worked previously, together with an apparent lack of interest in the fact that the nation was at war, was cited by several executives as being important factors in absenteeism.

Various means of combatting absenteeism were reported, none of which was said to be outstandingly successful. Posters, talks, letters, warnings, etc., were met with a good bit of indifference.

Lotteries and door prizes have met with some success, but at considerable expense.

One company has found that its employees reacted noticeably to talks by plant workers who had gone into the armed services.

In the final analysis, the problem appears to be mainly one of educating workers to a fuller understanding of the relationship between unbroken production on the home front and the life and welfare of the men in the armed services.

Steel mills in this area have generally not been affected to any great extent by absenteeism.

Another factor acting to keep absenteeism low in steel plants is the fact that the work week is not excessively long. One steel company said that the loss of man-hours through accidents was more serious, at the moment, than time lost through absenteeism.

A medium-sized metal fabricating plant, faced with a shortage of skilled machine operators, changed from three 8-hr. shifts per day to two 10-hr. shifts and immediately experienced a sharp increase in absenteeism.

A farm implement maker asserted that its plant Labor-Management Committee was playing a very important role in fighting unnecessary absenteeism. Generally, however, it was felt that the problem appears to be revolving itself primarily as a management problem, for organized labor leaders have thus far shown no real interest in the matter.

In fact, it was reported that efforts to discipline workers for proven excessive absenteeism are often hindered by shop union officials who threaten to strike the plant if the disciplinary action is taken.

Skill, Incentive, Money Affect Absences

Cleveland

• • • **War plant absenteeism,** for reasons other than illness or accidents, now appears to be traceable to work-incentive and job-skill. As either the worker's skill increases or the job requires higher skill, there is an increasing work-incentive and less tendency toward absences, whereas poorly skilled workers or those whose jobs require little skill are most likely to boost absenteeism. Those who are "new-rich" on war boom wages are also hearty offenders.

This consequently brings the offenders into these main classes: (1) The little-skilled newcomer to industry who feels small for any responsibility in overall production, (2) the draft-

aged young men whose civilian-life-expectancy is short, and, (3) the previously poorly paid inductee from some other industry whose war plant wages require time for spending.

Cleveland has specific cases of absenteeism that are causing trouble. For example, the Aluminum Co. of America, employing many in the lower skilled brackets suffers a high rate of absences. Here, the day of the week seems to have an affect as do holiday seasons. At one plant of the American Steel & Wire Co. where many of the current employees are from a low-paid coal mining district, time-off is considered necessary by the workers to spend their new, higher earnings.

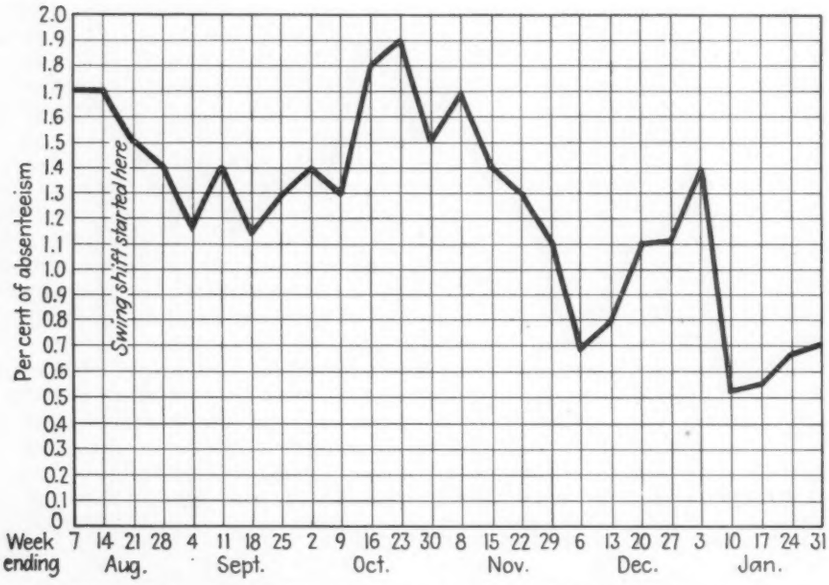
A recent investigation by Associated Industries, Cleveland, showed that on Monday, Jan. 11, the absentee rate in a cross-section of 181 Cleveland companies employing 68,199 workers was 4.8 per cent. A previous survey taken last Nov. 18, showed a 6.6 per cent rate. The 4.8 per cent absentee rate on Jan. 11 was almost double the 2.5 per cent rate generally believed to be the "norm" by WMC and other authorities. A study of absenteeism of males compared with females showed a 4.4 per cent rate for men and 6.3 per cent for the women.

Companies able to report on the length-of-employment factor said that 33 per cent of absenteeism was caused by employees of less than 90 days while another 50 per cent was caused by employees of less than a year. This again points to the effects of lack of skill and the work-incentive created by skill, plus unfamiliarity with the responsibilities connected with the particular job's part in overall production.

The Associated Industries' survey showed that the length of the work week had little effect. Looking toward the effect of long hours, the survey showed that those working up to 60 hours accounted for 4.78 per cent of absenteeism, slightly under the 4.8 per cent general average, and including those working over 60 hours per week the rate rose to only 4.83 per cent.

Conflictingly, more than half of the 181 companies reported that absenteeism was greater on a day other than Monday, usually the day after payday which is generally Saturday, while a special study by seven large companies employing 31,109 workers showed that absenteeism runs 50 per cent greater on Monday than the day after payday.

Jack & Heintz Co., the workers' Utopia, believes in keeping absenteeism down among its associates (employees) by "keeping 'em healthy" and removing the causes for being away from work. Their health program includes dispensing vitamin pills with the company furnished meals, check-ups of associates by company doctors and nurses, steam-baths, and similar services. For the associate who is worrying about his income tax reports, a department has been established to help him fill them out. Rationing registrations of all kinds are handled by Jahco's welfare department, and an attorney on a full time basis helps those with legal problems. Regular talks on a public address system are used to bolster morale. These and other similar efforts are this company's answer to the absentee problem, and, while to many this program may seem overdone, the least that can be said is that it works. In the five Jahco plants, absentee rates are very low and a plant will often report not a single absentee.



ABSENTEEISM CHARTED: Last August Ohio Crankshaft Co. decided to chart their absentees in the aviation division. Numbering slightly less than 1000 employees this is the way absenteeism ranged. A swing shift was established between Aug. 14 and 21 which is believed to have increased efficiency if not absenteeism. Personal calls on AWOL workers and telegrams have served to cut the rate somewhat. Other departments not covered by this chart report less than 2 per cent absenteeism.

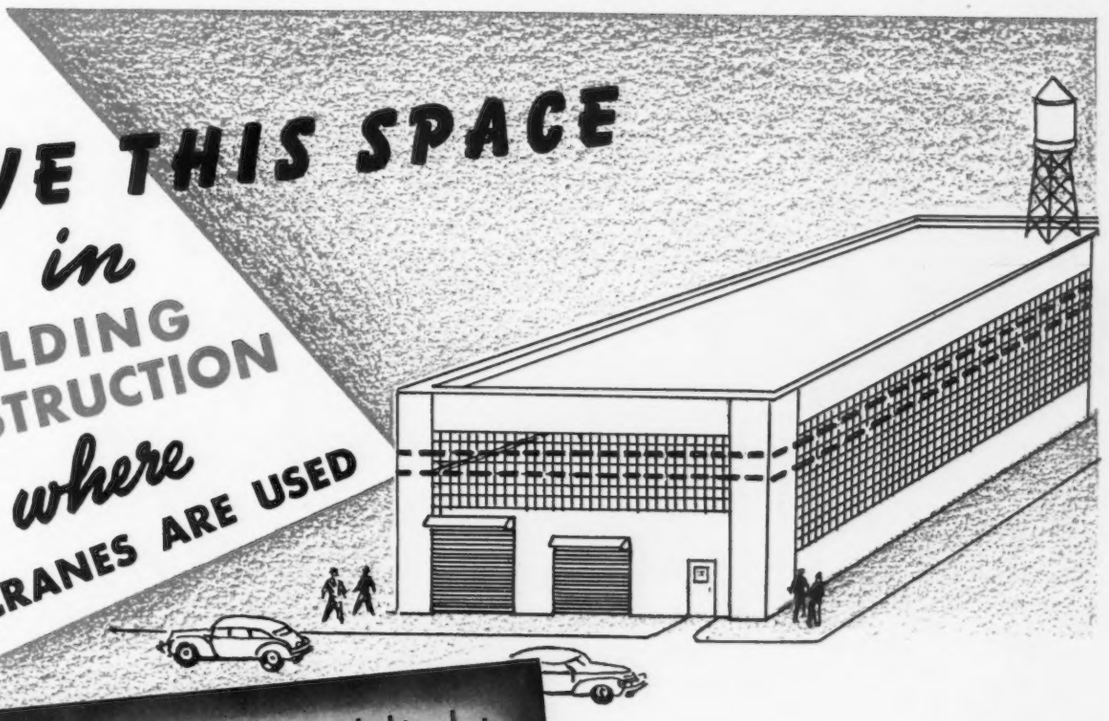
Cleveland Graphite Bronze Co., Cleveland, reports a running publicity campaign among employees stressing the patriotism and loyalty angle and checkups made as to the reasons for absenteeism.

A combined union-management program is underway at National Acme Co., making use of billboards, a regularly issued poster service, foremen's meetings and foremen's talks to employees. Their absentee rate is not too high.

Currently, the Cleveland Equipment Works of General Electric Co., is conducting a 55-day campaign to eliminate preventable absence from work. After the first nine days of the program, it was announced that 450 man-hours had been saved. Both labor and management have united in the program, which forms eight departments into competitive teams; uses daily box score charts of the effort, poster and plant publicity campaigns, talks to employee groups, and similar general appeals.

Ohio Crankshaft Co., sends "collect telegrams" to absent workers asking them why they aren't on the job and members of the personnel division call individually on the more flagrant cases. Also, score boards of absent hours are posted. Here, the absentee rate has been falling off, the company crediting it to a six day week with a swing shift rather than a straight seven day week and to the fact that casualty lists are now beginning to

SAVE THIS SPACE in BUILDING CONSTRUCTION where D-C CRANES ARE USED



Reduce heating and lighting needs—less piping too

THE cost of the horizontal section of building, illustrated above, represents a big investment. To include it means deeper footings, heavier building columns, extra requirements for heating, lighting, ventilating, etc.

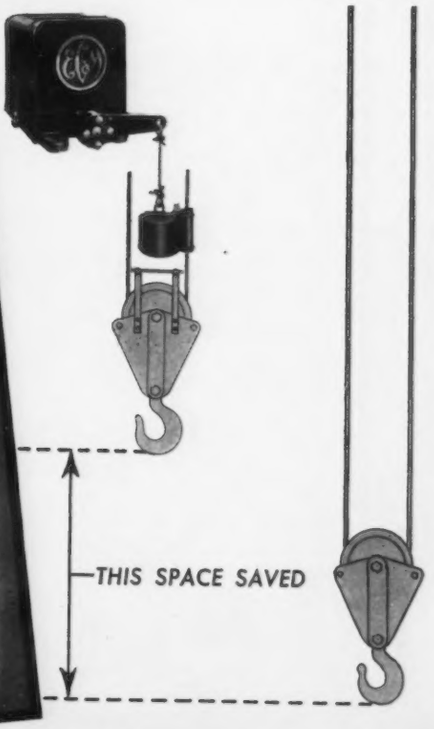
When such a building has D-c cranes geared for high production and equipped with anti-friction bearings, the hoisting speed of the empty hook may be as much as 2½ to 3 times full motor speed. This means that the tripping point for a circuit-opening limit stop must be set with sufficient clearance to insure safe stopping under this worst condition (empty hook at high speed).

The EC&M Youngstown Safety Limit Stop can materially reduce this distance and save construction costs. This Limit Stop not only disconnects the motor from the line but aids the hoist-brake in bringing the hook to rest quickly by dynamic braking. And being operated directly by the hook-block, stretching of the hoisting cables in no way affects the *final* stopping point.

Before planning new buildings, investigate this EC&M Youngstown Safety Limit Stop. Bulletin 1035 gives complete description and shows many interesting illustrations of how it is applied to overhead traveling cranes. Write for a copy.

QUICK-STOPPING type of LIMIT STOP gives MINIMUM DRIFT

CIRCUIT-OPENING type of LIMIT STOP requires GREATER CLEARANCE for DRIFT



THE ELECTRIC CONTROLLER & MFG. CO.

CLEVELAND ★ OHIO

contain the names of friends and relatives.

Meanwhile, the problem is beginning to take on a "civic" status. A more active and constructive interest by the unions in the problem was evidenced last week when 10 officials of local CIO unions were named to meet Feb. 1 with 10 representatives of the Cleveland AFL to map a plan of action to curb this problem. It was stated that union diciplinary action against willful offenders would be considered by the committee.

Upshot of the meeting was a recommendation that the problem of unauthorized absences be left entirely in the hands of Labor-Management committees to solve in their respective companies. Contrary to unbiased thinking the union committee named the chief causes of absenteeism as long hours, unfavorable working conditions and lack of cooperation on the part of employers.

several months, partially as a result of a concentrated drive with posters, letters, etc., on the importance of coal in the war effort. It is believed by many coal companies here that the six-day week in the coal mines, with its time and one-half on the sixth day will tend to cut down the absentee rate.

One difficulty in arriving at a concrete and reliable figure on absenteeism in the steel industry is the fact that many absences are credited as sickness when in reality they are due to "bad headaches," shopping, etc. Steel companies have found that the only way to get a real approach to the situation is to have individual foremen make periodic reports on absenteeism. A complete knowledge of the men under their direction enables them to determine the real reason for the "stay-aways."

The very fact that many steel companies are concentrating on the absentee question is in itself a deterrent to these uncalled for absences. Surveys and personal attention by the foremen tend to make the employees far more conscious of their time-off than would have been the case if normal routine excuses were accepted.

Some intangible success has been obtained by the United Steelworkers of America in their newspaper by portraying with cartoons, etc., the necessity of an all-out war effort. THE IRON AGE has been told that the USWA are cognizant of the absentee problem and as soon as some definite figures are available, even more attention will be placed upon this important question.

Management, labor unions, and employees are fully aware that a reduction in the absentee rate means a certain alleviation in the manpower shortage. It has been found that by far the majority of absentee cases occur immediately after payday, and as a result constructive measures are being concentrated upon these periods. The importance of this situation to manpower is indicated by an example somewhat as follows: A foreman requiring 200 workmen finds he has 175, with 25 men off for various reasons. This necessitates a call to the employment offices for additional workers, which shows up as a manpower shortage. If concrete reductions were obtained in absenteeism in cases like this, obviously some pressure would be relieved in the manpower situation.

Employment managers, unions, and employees in general are realistic enough to acknowledge that during times like the present a jump in the absentee rate is almost a foregone

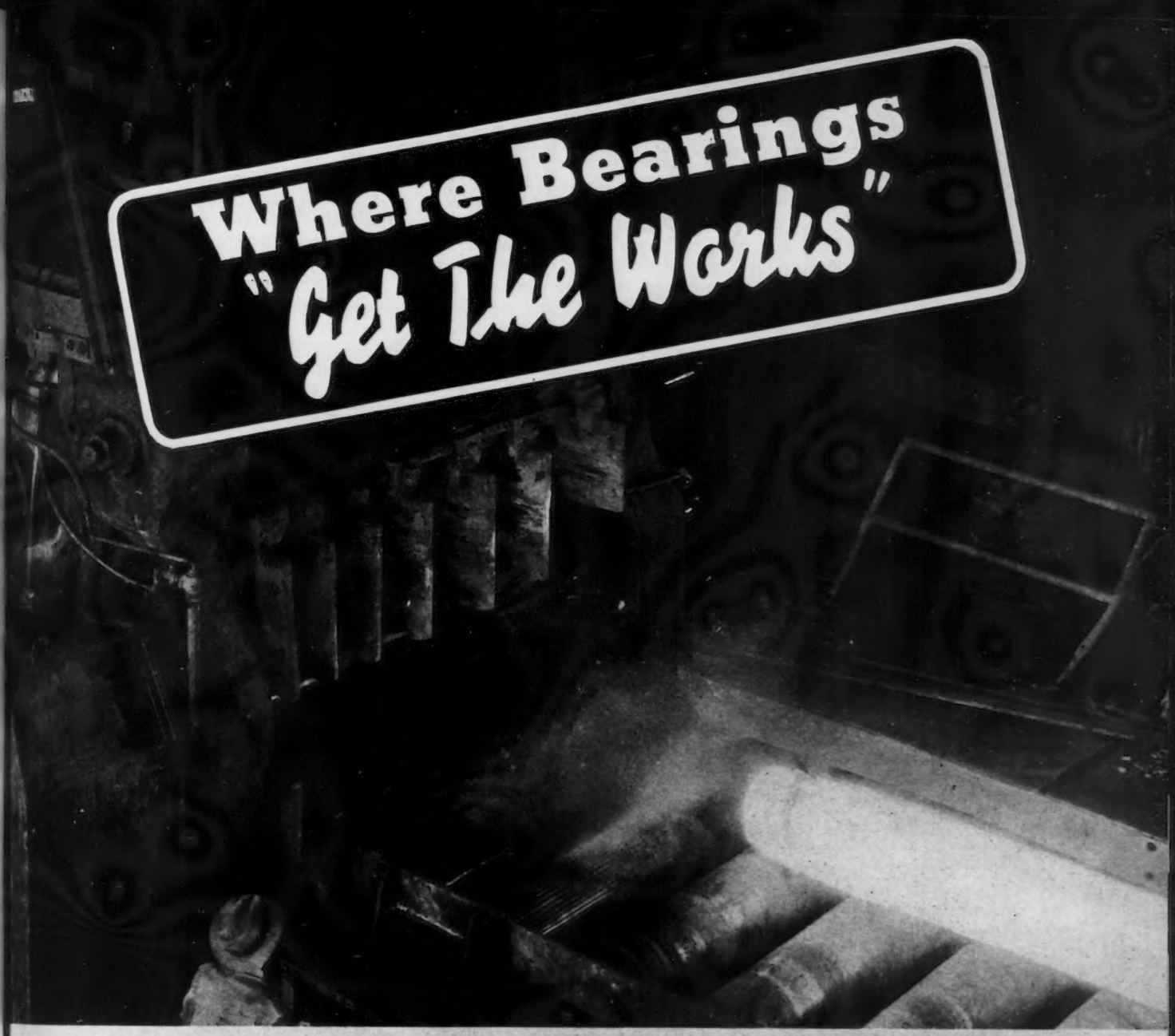
Manpower Aided by Cut in Absenteeism

Pittsburgh

• • • **A halt or a** reduction in the growing rate of absenteeism in the steel and coal industries here would go a long way toward mitigating, to some extent at least, the present manpower shortage. Studies made by many steel and coal companies indicate that average absenteeism figures do not tell the whole story. Groups such as women or negro workers, seem to have a far greater percentage of the total absentee rate than the percentage they themselves constitute of the total workers.

Management, labor unions, and Labor-Management committees here are watching closely the whole absentee question and rather than attacking it as an absentee problem, they are concentrating on a need for an all-out effort to win the war. One coal company has found its absentee rate reduced considerably in the past

ABSENTEEISM OR POOLED RIDES: Personal attention is becoming the management answer to many questions including absenteeism and car-pools for workers. Some plants, fighting absenteeism, remove the time cards of absentees and require a personal interview to get them back. Here, workers of Federal Shipbuilding & Drydock Co. are consulting their "Ride Bureau" chief to get together on car-pooling for transportation.



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For many years operators in this plant thought expensive lead soap and graphite greases were necessary for lubricating the roll neck bearings of blooming mills. But this practice was soon abandoned when Sun Engineers—those Doctors of Industry—recommended Sun Heavy Duty Pressure Grease. Now these lubricants stand up under extreme pressures, high heat, and water constantly flooding the rolls. Bearings show little or no signs of wear . . . lubricant does not wash off . . . and lubricant lines are never clogged as was often the case with products previously used.

Today, in this plant Sun Lubricants are standard throughout . . . in pressure systems or hand lubricated installations . . . from bar mills to conveyors. Whether you operate a steel mill or a textile mill . . . a machine shop or a munitions plant there's a Sun Lubricant to meet your requirements. And Sun Oil Engineers always stand ready, willing, and able to help you help America with more production. Write . . . .

SUN OIL COMPANY, *Philadelphia*

Sun Oil Company, Limited, Toronto, Canada

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SUN PETROLEUM PRODUCTS *HELPING INDUSTRY HELP AMERICA*

conclusion. This sensible approach to the problem, however, has not caused any relaxation in attempting to find ways and means to reduce absenteeism caused by reasons other than actual sickness or accident.

It can definitely be said that the scrutinizing of normal or ordinary personnel records is a far cry from finding the real reasons for "time off without leave." Companies are finding out more each day that the real absentee picture can only be obtained from first line supervisors or foremen. Among the many reasons for unpermitted time off are fatigue, weekend trips, intoxication, inadequate recreation, lack of adjustment, family responsibilities, dissatisfaction with specific shifts, general war unrest and lack of responsibility.

UMC Traces Absenteeism to Main Causes

Detroit

• • • **Findings** of the local War Manpower Commission here indicate that war plant absenteeism can be attributed to 11 main causes which include illness, job shopping and piracy, lack of information on the relationship between the employee's work and the finished product, and the importance of the product to winning the war, long hours and excessive overtime, high wages and wartime prosperity, inadequate housing and transportation or both, lack of carefully planned production schedules, the call of household duties to women workers, lack of good supervision, hiring in excess of immediate needs and accumulations of finished goods at plants which causes workers to believe they aren't necessary.

Preliminary studies of 45 plants in Michigan, Ohio and Kentucky reveal that in more than half, employing 210,000 workers, absenteeism is seriously hurting output and runs from three to more than six per cent of total working force. Little difference is registered in records of men and women, white and colored and of other groups.

In General Motors, short term absenteeism (less than a week) has doubled during the past 15 months. For male workers it has gone to around three per cent as compared with an average normal of 1½ per cent, and in women's cases this has about doubled in both categories. There is no indication in these studies that high absenteeism is related to long or short work weeks. It is general experience in all plants that when work weeks get above 60 hours the absentee rate climbs alarmingly. Apparently 60 hours is a maximum for efficient work. Absenteeism also climbs highly in seven-day work schedules. As an example there is cited the case of a screw machine plant where men in one section work 7½ hours for seven days and in another section 7½ hours on a six-day swing shift. Time lost by the seven-day men was about twice that of the six-day swing shifters. However, 10-hour work for six days is frequently possible without serious loss in attendance or reduction in efficiency.

It is generally understood here that a high proportion of absenteeism occurs among newly hired employees. It is said that about 10 per cent of the employees are responsible for 50 per cent of the absenteeism. This is attributed to the fact that many of the new employees do not have steady work backgrounds, coming from the Arkansas hills or from WPA rolls. Further, these workers are of a comparatively low economic strata and can be expected to lack the economic incentives which spur other workers.

Recently hired women, surprisingly enough, show a considerably lower rate of absenteeism. This is attributed to the fact that many of them are housewives with tradition of regular work behind them. Also, they are apt to have relatives, husbands or sons in the armed services.

Ford is finding that the hiring of middle-aged women rather than youngsters is having a fairly good effect on absence rates. They seem better able to stand the physical requirements of their jobs.

Problem Points to Morale and Labor Quality

New York

• • • **The problem** of absenteeism is considered by some observers here to be a reaction to the drain of the better industrial personnel by the armed forces and possibly a general lowering of national morale in the work force.

These observers point to the possibility that the cream of industrial personnel was swallowed by the armed forces before draft deferment for critical occupations became effective. Dealing with the psychological aspects, industrialists have always leaned heavily on the young married or single men who exhibited ambition and responsibility to gain promotion. These were often the truly conscientious workers who knew the responsibilities of their work and who consequently were the most steady and productive workers. The very conscientiousness, which made them good workers, is also credited in many cases with causing their enlistment.

An analysis of the absentee problem in the Detroit war plants is given in the Assembly Line on page 76.

In contrast with this, plants today have an increasing number of new workers made up of young men who know that their employment is limited to the graces of the draft board, inexperienced newcomers who do not realize the importance of the part that they make as related to overall production, and women who while willing, have little if any industrial background and frequently only the scarcest knowledge of the importance

Absenteeism Called Most Flagrant Abuse

• • • Capt. Eddie Rickenbacker, speaking last week before the Los Angeles Advertising Club, condemned absenteeism, featherbedding practices and other factors which strike at our war production. Citing what could be expected if men from the fighting fronts were exchanged with workers, he said: "We would have no featherbedding, slowdowns, restrictions on effort. The perpetual slow-down in war industry, caused by absenteeism, particularly in the aircraft industry, where it exceeds an average of 10 per cent, is probably the most flagrant abuse of your obligation since Pearl Harbor.

"It is not the loss in individual man-hours that is so deadly, but the accumulated loss of thousands of hours on the production line of other employees caused by individual absenteeism which, during the past year, has run into millions of man-hours."

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DoAll Gage Blocks come in the following accuracies:

Working Set—Eight millionths of an inch	**$295.00**
Inspection Set—Four millionths of an inch	**350.00**
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A room with temperature controlled at 68° is recommended for using this set.

Each set consists of 81 gages.

Write us immediately for complete data and good deliveries

SAVAGE TOOL COMPANY

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Local DoAll offices distribute Gage Blocks. They also sell and service DoAll Precision Surface Grinders and the equipment shown below. See your Telephone Directory for nearest DoAll office.

DoAll CONTOUR SAWING AND FILING MACHINES

Built by our associate company, Continental Machines, Inc., Minneapolis, Minn.

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Made by our associate Company, The DoAll Company, DesPlaines, Ill.

of their duties. Education of these workers seems to be the answer to gaining the conscientiousness required to make steady workers of them.

Since absenteeism has shown definite evidences of growing rather than declining, some industrialists interpret this fact as meaning that worker morale is lowering with the inroad of new labor. Records more or less bear this statement out in that absenteeism has been shown to decrease where successful morale boosting methods have been employed.

The Army and Navy long ago created morale-building, work-incentive plans mostly based on bringing war heroes back to the plants to talk to workers. Once the worker realizes that every part he makes has a definite bearing on the life and safety of a soldier or sailor, possibly of his acquaintance, absenteeism becomes less of a factor.

Fighters' Letters Spur Steady Work and Production

• • • Confirming statements that workers are favorably affected by information which proves the value of their efforts to members of the armed forces, Youngstown Sheet & Tube Co. reports excellent results and improvement in worker morale caused by letters of encouragement written home by former employees now in the armed services.

The company publication, the "Bulletin," carries these letters to the worker. Some typical excerpts from them show what makes manpower powerful.

Pfc. Mike Fabian, on desert maneuvers, said: "I'm in an armored division so I know how bad we need steel and plenty of it. . . ." Corporal Louis Alb, Jr., of Camp Kilmer, N. J., said: "The boys at home have jobs just as important as we have. . ."

Another man sent this message: "Keep it up, boys, because every pound of steel means something now. We boys in the service are giving our best and when we know the boys back home are doing their best, our morale is at top level."

"I only hope the men back home fully realize the importance of the work they are doing, because the faster they can produce the steel to make ships, planes, guns, tanks, and ammunition, the quicker and more decisive our victory will be," wrote Pvt. Cyril Adamko, Fort Sill, Okla.

Al Greco, editor of the company publication, was the person who got the idea for the letters.

Four Agencies Cooperating in Standardized Rail Removal Program

• • • With the disappearance of WPA from the rail salvage field, the process of gouging out old streetcar tracks and sending them to steel mills has been standardized. The routine now being nationally followed involves four government agencies — RFC, MRC, WMI and WPB — plus private contractors. It provides an interesting example of dovetailed working by government agencies.

The Conservation Branch of WPB has the say on which rails are to be salvaged, just as it decides on all other salvage projects to be undertaken by War Materials, Inc. Originally, these decisions on high cost projects were to be WMI's province, but soon after WMI's organization last fall, the Conservation Branch wrested away this power.

After a project, rail removing or other, has been decided upon and accord reached with the municipality or owner involved, a WMI regional office takes over and advertises for bids from private contractors. WMI is an agent for Metals Reserve Co., and occasionally MRC itself handles this part of the transaction. Bids are sent to the head WMI office in Pittsburgh, where the contract is awarded. The job is then overseen by a regional WMI man.

Each contract includes removal of rails, repaving, loading and shipping. In a very few cases, WMI makes rail removal contracts with cities, but in by far the majority of cases private contractors handle the work. The difference between what the project costs and what the salvaged rails bring is made up by the Reconstruction Finance Corp. No figures are being given out on costs per ton, but they are likely several times the scrap values.

When shipping time arrives, WPB again comes into the picture with decisions on whether the scrap will be used for relaying, rerolling or scrap, and where. The largest portion, by far, of the salvaged rails goes for scrap. It is not cut into charging box size; preparation is left to the mills.

All WMI rail removal is done by the "slot" method, in which only a narrow strip of paving is torn up. What sort of machine is used for pulling the rails is up to the contractors, most of whom have pet designs.

With improving weather, WMI expects to go into rail salvaging on a larger scale, particularly in the Middle Atlantic and New England districts. In instances where the WPA had negotiated but not started work on rail salvage projects, the WMI will take over. In Massachusetts, where WPA salvaging was very active, such negotiated projects amount to 34,466 tons.

Ore Vessels Must Make More Trips During 1943

Buffalo

• • • Each ore vessel on the Great Lakes must average 39 or 40 trips instead of the 37 made last season if the 1943 goal of 101,000,000 tons set by the WPB is realized, according to Capt. T. Howard Saunders of Buffalo, chairman of the navigation and legislation committee of the International Shipmasters Association. The tonnage asked by WPB is about 10 per cent more than the ore hauled in 1942. Capt. Saunders said shipmasters would try to make the first sailings next month.

McKeough Named To Head OPA District

• • • Price Administrator Prentiss M. Brown announced appointment Feb. 3 of Raymond S. McKeough as OPA Regional Administrator in Chicago. This region includes the states of Illinois, Wisconsin, Iowa, Nebraska, Minnesota, North Dakota, and South Dakota. Mr. McKeough, formerly a member of Congress, succeeds John C. Weigel, resigned.

Full Time on the War Effort

As the largest jobbing producer of nonferrous castings in the United States, the Howard Foundry Company is naturally on a full war time basis.

The three Howard foundries have stepped up their capacity to meet war's needs for magnesium, aluminum and copper base castings. Howard's answer to the ever-growing call for magnesium castings was the construction of a new magnesium foundry with a capacity of over 500,000 pounds of castings per month. "Plenty, and On Time!" is a Howard slogan.

Howard nonferrous castings are going to every front; in planes, guns, tanks, ships, ammunition and military vehicles. They are playing their part in giving the United Nations better fighting equipment. Too, they are being widely used in essential machinery employed in the war effort at home.

War time applications of nonferrous castings, especially magnesium, are disclosing important peace time uses. Now is not too early to investigate the possible uses of magnesium in your post-war products. An informative booklet, "Nonferrous Castings and Their Uses," is yours for the asking.

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CASTINGS

Steel Recovery Program Streamlined

Pittsburgh

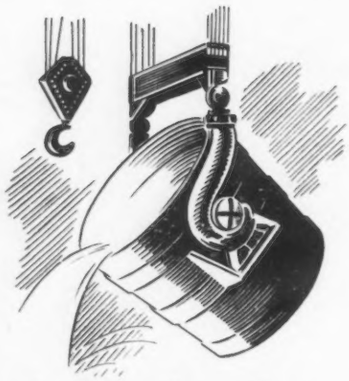
• • • **Means of facilitating** the flow of large tonnages of excess and idle inventories of steel developed by Steel Recovery Program into war effort were evolved here last week at a series of conferences between regional field representatives of the WPB and the administrators of the National Steel Recovery Program groups.

A major result of these conferences, officials said, was the adoption of a complete coordinated plan which will enable each WPB regional field office to effectively serve the manufacturers in his region without loss of time in meeting the many materials emergencies now confronting them.

As a result of contacting some 50,000 manufacturers, large tonnages of steel of various types embracing stainless, bars, tool, structural and many others have been made available to those manufacturers engaged in the production of essential war materials. Time losses due to shortage of materials are being minimized, due to the fact that each of the 12 regional offices of WPB are now armed with a complete list of these inventories, together with the names and addresses of the holders. In many cases it is found that the holder of such an inventory is located in the same region as the manufacturer confronted with a shortage, so that spot shortages can be quickly filled with the time element so reduced that threatened shut-downs are avoided.

Within a period of two weeks, representatives of the Materials Redistribution Division, under the supervision of Mr. Thornton E. Stokes, will have covered from coast to coast every regional office of WPB, explaining to the field representatives just how they can best serve the industries in their regions, not only in procuring needed materials for them, but also in aiding holders of such excess inventories to so report such inventories as will enable Steel Recovery to move them into active war industries as quickly as possible.

ACP Products and Processes CONTRIBUTE in Record Steel Production



With steel mills throughout the land straining for peak production, the savings in steel and acid made possible by RODINE are more important than ever before. Also of great importance now is the safety factor provided by RODINE. It prevents overpickling and scrapping of finished steel under the pressure of the rush to produce.

Other ACP Products and processes are lending a hand, too. CUPRODINE is used to produce a dense, bright copper coating on steel by a simple immersion (non-electrolytic) process in wire mills and on steel shell cases before drawing. RIDOLINE and the ACP Alkali Cleaning System cleans strip and plates in a continuous operation to speed-up production and provide better finishes.

•

These Products and Processes are, however, only typical of the many contributions ACP can make to your production goal.

Others include: DEOXIDINE to prepare steel, aluminum and dural properly for painting; FLOSOL the exceptional soldering flux; KEMICK for painting metals subject to high temperatures; LITHOFORM to coat galvanized iron to hold paint.

Let the quarter-century of experience that has made ACP Products and Processes known the world over help you solve the problems of today's production . . . no matter what your metal treating and finishing needs.

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Sheet and Tube Co. Shows $10,305,700 Profit for '42

• • • **A net profit** of $10,305,705 for the year 1942 was reported by the Youngstown Sheet and Tube Co., as against a net profit in 1941 of $16,124,401. This was equal to $5.66 a share on common stock in 1942 which compares with $9.13 a common share in 1941. Provision for federal normal income tax was $4,920,000 in 1942 and excess profits taxes totaled $19,780,000 versus $8,127,000 and $13,373,000 respectively in 1941.

•

National Steel Reports $11,929,867 Net Earnings

• • • **National Steel Corp.,** reports net earnings for 1942 of $11,929,867, equal to $5.41 per share on 2,205,667 shares of capital stock, compared with earnings for the preceding year of $17,102,350, which equaled $7.75 per share. This report was made after all charges including a reserve of $2,000,000 for contingencies and postwar adjustments. Provision for federal normal income and excess profits taxes in the amount of $30,000,000 was made in 1942, compared with provision of $19,825,000 in 1941.

Introducing . .

A Houghton Salt Bath for Quenching War-Time Steels

HOUGHTO-QUENCH NE

ADVANTAGES:

1. *HOUGHTO-QUENCH NE possesses a rapid quenching speed through the critical zone from 1300° to 1000° F.*
2. *It has a low melting point.*
3. *It is a fluid, low-viscosity salt having high thermo-conductivity.*
4. *It is stable . . . non-sludging . . . unharmful to the surface of steel.*
5. *It has minimum carry-away losses.*
6. *It is easily cleaned from the steel.*

Designed for the new MARTEMPERING* Process

The usefulness of "lean" alloy NE steels cannot be extended by use of drastic quenches without serious trouble due to quench-cracking and distortion. Maximum physical properties can be developed with safety by the Martempering process especially on "lean" alloy steels which have been increased in hardenability by the use of higher carbon content.

Quenching from austenitizing temperature into an agitated, fluid, salt bath at 400° F., holding until the temperature is equalized throughout the piece, removing and allowing to cool in air, results in a minimum of residual stress. If the critical cooling rate has been exceeded, full hardness will be obtained.

Houghton has developed a special salt bath material of low melting point and low viscosity for this purpose. It is stable and non-corrosive, cleans easily. For full details of inexpensive furnace construction and controls, see the Houghton Service Engineer, or write direct to—

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* **MARTEMPERING** is the term applied to the quenching of low alloy steels in liquid baths at elevated temperatures to produce a martensite structure. This process develops maximum physical properties without distortion, cracking or residual hardening stresses.

THE HOUGHTON LINE
OF PRODUCTS FOR THE METAL INDUSTRY

Possibility of Coal Strike Seen

Pittsburgh

• • • **The perennial** anxiety which usually precedes advance demands for higher coal mining wages is now in full blossom among industrial and steel concerns. Whether or not there is to be a shut-down at the mines, with its possible consequence of loss in war production, has no effect on the loss of sleep which is piled up between now and the time some sort of settlement is made.

The entire wage situation, involving a demand of $2 a day, becomes more serious this year in view of strategic war output. While most industrial concerns and steel companies have substantial supplies of coal, there are a few apparently minor facts which usually result in early shut-downs of some blast furnaces in case a strike should last for more than a week or two.

This situation, where blast furnaces have shut down in the past, is due to the fact that certain employees at beehive coke plants are members of United Mine Workers. This in case of a strike ties up production of beehive coke urgently needed by some merchant blast furnaces, as well as certain steel making blast furnaces.

In December, 1942, by-product coke ovens had approximately 44 days' supply of coal, compared with 38 days in December, 1941. A greatly prolonged coal mining strike would be necessary before by-product plants would be seriously hit. Total industrial coal supply in December, 1942, according to the Bureau of Mines, amounted to 57 days compared to 45 days in December, 1941.

The vulnerable spot in case of a coal mining strike would be some Western Pennsylvania and Ohio blast furnaces which depend wholly on beehive coke supplies for fuel. About 15 per cent of the total pig iron production in the Pittsburgh area is dependent upon beehive coke supplies. Lack of this metal would, in turn, affect steel production.

INSPECTION MADE EASY: Production of a vital airplane part has been stepped up 20 per cent by Westinghouse Electric through the use of special inspection instruments shown above. The part is an acorn-sized commutator used in aircraft radio sets. The inspection instrument employs a light bulb, two mirrors and four glass lenses to reflect an image of the commutator's surface magnified 22 times on a glass screen.

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TIME IS SHORT!
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PULVERIZED COAL
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Fuel oil and gas *must* be replaced *now* with pulverized coal, if operations are to continue at their present record rate. • AMCO is prepared to furnish complete Pulverized Fuel Systems for all types of furnaces in the Steel and Non-Ferrous Industries.
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2

Steel Ingot Output in January Crowds All-Time Mark of October

• • • **Steel production** in January totaled 7,408,744 net tons of ingots and castings, the second highest monthly production total on record, according to the American Iron & Steel Institute.

The January total compares with 7,303,179 tons produced in December, and with the January, 1942, figure of 7,124,922 tons. The record output is 7,584,864 tons in October, 1942.

During January, the steel industry operated at an average of 97.8 per cent of capacity, as against operating rates of 96.6 per cent in December.

An average of 1,672,403 tons of steel was produced per week in January, compared with 1,652,303 tons per week in December, and 1,608,335 tons per week in January, 1942.

Output of 93,000,000 Tons of Steel Predicted in 1943

Washington

• • • **A forecast of** 93,000,000 tons of steel in 1943 was made last Thursday by leading steel industry executives at the regular monthly meeting of the Steel Industry Advisory Committee. Calculated on operations at 98 per cent of rated capacity and completion of the approved expansion program on schedule, the estimate was based on the expected 1943 pig iron output, securing approximately 15,000,000 tons of purchased scrap and 25,000,000 tons of recirculating scrap.

Paul V. McNutt, Manpower Commission chairman, assured heads of steel companies that every attempt is being made to make withdrawals of men from war jobs orderly so that productive operations will be impeded as little as possible. By the end of the year, Mr. McNutt pointed out, however, 10 of every 14 men between the ages of 18 and 38 who are physically able, will be in the armed services.

The industry's record in meeting car loading requirements set by ODT was commended by B. H. Taylor, WPB Deputy Director of Transportation. Mr. Taylor revealed that during November and December, the steel industry as a whole exceeded the loading requirements set by ODT Order No. 18 by 3 per cent.

Possible modification of NE steel specifications was discussed as they might be effected by the use of alloy turnings and borings which are piling up in large quantities. The miscellaneous analyses of the borings and turnings, together with the fact that they have to be routed by consumers to steel producers who would have instant need for a particular analysis, is said to be responsible for the piling up of large inventories. The problem of segregation also affects the disposal of these materials.

War Output Hit by Late 1942 Cleanup, Nelson Warns

• • • **Because of** the drive at the end of 1942 which stripped some assembly lines of materials, war production in January in some areas was affected adversely, according to Donald M. Nelson's seventh monthly report on war output.

An unusual effort was made to lift December output of airplanes, resulting in the delivery of 5,489 units, although several hundred planes were accepted and went into the "pool" in the last day of the month even though they lacked parts. The pool was back to normal by Jan. 10.

By categories, December production showed these percentage gains over November:

Aircraft	up 20 per cent
Ground ordnance	up 25 per cent
Navy and Army vessels	up 1 per cent
Merchant ships	up 9 per cent
Miscellaneous munitions	up 11 per cent

"Each increase in monthly production from now on will be harder to obtain," said Nelson. "We plan to produce during 1943 roughly twice the volume of munitions produced last year. Expressed slightly differently, we expect the average monthly rate of production for this year to be about 50 per cent higher than the average for the last three months of 1942.

"Following a set-back in machine tool production in November, volume advanced substantially in December, reaching a new peak. The total of $131,900,000 represented a gain of 9.1 per cent over $120,900,000 for November, and of 1.5 per cent over the previous high of $130,000,000 in October.

"The backlog of orders continued to decline. The average time required for the completion of unfilled orders was 6½ months at the end of December, compared with almost eight months at the end of November.

Delivery of Vessels Declines in January

• • • For the second consecutive month, more than a million tons were added to the Victory Fleet, with delivery of 106 vessels totaling approximately 1,008,400 deadweight tons in January, the Maritime Commission announced Feb. 4.

The Commission attributed the temporary decline in January from December's record high of 121 ships to "previous shortages of steel and delays in completion of the higher type propulsion equipment, as well as severe weather conditions."

Average building time of Liberty ships was cut to 52.6 days in January as compared with 55 days in December. This marks the thirteenth straight month that American shipbuilders have cut the building time from keel-laying to delivery. The three Liberty ships delivered in January, 1942, averaged 241 days.

West Coast yards held the lead by delivering 54 vessels, East Coast, 36 and the Gulf Coast, 16. Most productive yard in the nation was California Shipbuilding Corp., Wilmington, Calif., which delivered 14 Liberty ships.

January Plate Output Sets Record; Irvin Works at Peak

Washington

• • • **Steel Division** Director H. G. Batcheller announced on Friday that January plate production of 1,135,413 tons established an all-time record.

The best previous month was July, 1942, when output was 1,124,118 tons.

Plate production of continuous strip mills reached a high of 565,893 tons over the previous record of 551,959 rolled last August.

The Irvin Works of Carnegie-Illinois Steel Corp., near Pittsburgh, began its 1943 production offensive in January by setting a new record for monthly production and shipment of ship plates, enough for more than 75 large tank landing ships of the type being built in the Pittsburgh district. In January the mill operated at better than 200 per cent of its originally estimated capacity.

. . . Shadowy Jurisdictional Lines Clarified at

Washington

• • • **The recent** differences between WPB Program Vice Chairman Ferdinand Eberstadt and WPB Production Vice Chairman Charles E. Wilson do not threaten to split WPB in half, won't "lose the war," nor be the immediate cause of either of them resigning, it was learned last Saturday. WPB Chairman Donald M. Nelson also is not contemplating quitting. Congressional sources say that there is no organized move now afoot for legislation to create another agency to replace WPB.

Because all WPB officials now realize the harmful effect of the public airing of their dispute, there is a desire to minimize the disagreement. Moreover, while most officials are willing to explain what has happened they do not want to be quoted.

Here's the low down. Mr. Eberstadt resisted the transfer of the following divisions from his shop to Mr. Wilson's: shipbuilding, general industrial equipment, tools, automotive, safety and technical supplies, facilities division and bureau, and the aluminum and magnesium division. Mr. Wilson wanted control of these divisions because he thought he needed them to do the scheduling job Mr. Nelson had outlined broadly several months previously.

It was not overvaulting personal ambition on the part of either man at the base of disagreement. The situation was caused by the fact that Mr. Nelson early delegated authority over materials to Mr. Eberstadt and no order was issued until very recently detailing Mr. Wilson's powers.

Mr. Nelson could not define Mr. Wilson's sphere until he got a decision on how much of the armed services' scheduling authority WPB could exercise. Meanwhile, the Chinese proverb "Good walls make good friends," was being proven true. Mr. Wilson was in an anomalous position because he did not know what if anything he was going to schedule. He could not set up a shop on scheduling without a Nelson order. While Nelson orders conferred much of his authority to Mr. Eberstadt, Mr. Wilson was supposed to be the chief scheduling man.

So for months the jurisdictional lines were shadowy and consequently caused a certain amount of friction. Mr. Wilson and Mr. Eberstadt agreed that critical components should be scheduled. When it was found that the Army and Navy had no objection to WPB scheduling of components, as opposed to end products, it was only natural for Mr. Wilson to want to go to work after so many months of inaction. Mr. Nelson was too glad he would now be able to satisfy Mr. Wilson because he had been under considerable pressure from Mr. Wilson and others to do something about setting up Mr. Wilson's shop.

Mr. Eberstadt had no desire to prevent Mr. Wilson from scheduling components but saw no reason for transferring industry divisions to Mr. Wilson, thus creating a dual authority which might result in conflicting orders.

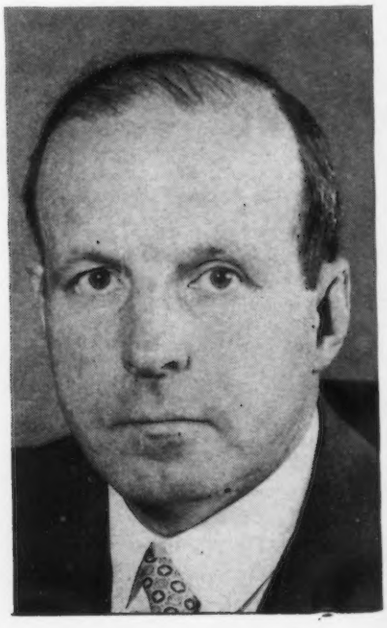
Thus, when Mr. Wilson issued his now "famous" and generally unpublicized Jan. 20 letter to munitions manufacturers directing them to place orders for 32 critical components needs in the next six months by last Saturday—Feb. 6—a great deal of confusion resulted.

Nobody knew about the letter except the Claimant Agencies and manufacturers. WPB Industry Divisions were ignorant of it, as was Mr. Eberstadt who headed up the more than 30 of such divisions. Letters poured into WPB asking if the Wilson letter had to be complied with. Producers were anxious to know, because they were also up against a more or less inflexible deadline of Feb. 9, for getting their CMP applications for allotments of controlled materials in to Washington. Clerical headaches were the complaint.

At a recent press conference Mr. Nelson said that he had neglected to inform the WPB people but said that the letter was valid enough. At the same time he made public Mr. Wilson's production authority as well as the transferring of the foregoing industry divisions from Mr. Eberstadt. The order also created the office of WPB director general for production, who so far has not been named.

Mr. Wilson has in preparation general instructions on component sched-

C. E. Wilson



Ferdinand Eberstadt

THE AIR IS CLEARED: It is expected at Washington that C. E. Wilson and Ferdinand Eberstadt, once having had their differences composed, will form an effective working team.

WPB; Component Orders May Be Bunched . . .

uling. It is said that they will be announced within a month.

Meanwhile, Mr. Eberstadt called in all of his top men on Saturday and told them that since Mr. Nelson had made his decision, it was up to all to see that it was carried out to the fullest. Stressing that the most important thing was winning the war, he told officials that past differences should be forgotten.

Mr. Wilson also called a staff meeting at which he told subordinates that they should cooperate with all of the war agencies. Mr. Wilson said that effective scheduling would raise production at least 10 per cent and was mildly critical of previous production planning on the part of WPB.

The results of the Wilson letter and the conferring of production powers on him by Mr. Nelson are said by government spokesmen to be three-fold. First, **the air is cleared.** It is expected that Mr. Wilson and Mr. Eberstadt, once having had their differences composed, will form an effective working team. As one high official pointed out, they are both very competent men, needed by WPB.

• • • Important decisions have been made in the realignment of WPB, summarized on these pages. At the same time a step toward obtaining the proper vital parts at the proper places at the proper times has been taken. THE IRON AGE herewith interprets and analyzes last week's actions.

Secondly, CMP itself is expected to remain unchanged. However, the bunching of orders for critical component parts in the next six months may cause heavy order backlogs temporarily. If order inflation for components occurs through a shortage panic, claimant agencies can cut it off if the components are "A" products under CMP. If they happen to be CMP "B" products, as most component parts are, it may be difficult for WPB to lop off excess orders. Naturally, material unbalance temporarily will occur until some way can be found to see what component requirements actually are. On the other hand, the opinion is expressed by some that it will be impossible to flow components, and at the same time materials.

Finally, an opportunity will be afforded WPB to show what it can accomplish through scheduling as an adjunct to CMP. If it is successful, Army resistance to end-product scheduling may be overcome.

Steel Industry Seen Aided By Action

Pittsburgh

• • • The recent requirement that components for the first six months should be placed on order by Feb. 7 and last half requirements by March 1 is not expected to be reflected much if at all in steel mill order books.

This move, however, probably will put steel companies in a better position to assist in getting out raw materials necessary for such components because **total needs** will have become known. Actual ordering of the steel for these components obviously will have to follow the lines set down in the CMP, even though manufacturer's order books reflect the orders for components.

Had such an order not been issued, component steel requirements might have been inserted after the CMP had gotten under way and thus caused some interference with steel rolling schedules. As the matter now stands, the knowledge which the various claimant agencies will have as to the yearly component needs is bound to have a beneficial effect on the steel angle.

Main criticism of the component setup was that manufacturers and prime contractors were not given time enough to get the job done. On the other hand, Washington has been repeatedly criticized for not doing something about the situation. WPB probably wanted the CMP to get started without several of its component parts missing.

Jam on Orders Lighter Than Expected

Cleveland

• • • The expected heavy rush in placing orders for "critical components" following the directive issued by C. E. Wilson, vice-chairman of WPB, was not forthcoming. There apparently are two reasons for this situation, the first being that manufacturers needing such items to finish existing contracts feel that when the time comes for using such items, they will be forthcoming. The flurry of setting up advance estimates and doing it within a short space of time, it is felt, is unnecessary and probably would lead to greatly over-estimated requirements that would be pared down by WPB before delivery.

Another reason is that contractors were not quite sure such orders could be placed without sufficient authorizations. However, within the past few days it was made known that orders could be placed on the basis that delivery would be made only if authorizations were forthcoming.

The directive, issued Jan. 20 to the 14 claimant agencies, stated that orders were not being placed in volume adequate for these items. Critical components required for manufacturing during the first half of 1943 were required to be ordered by Feb. 6, while March 1 was set as the deadline for materials required during the second half of the year. Bearing out the assumption of manufacturers that these items will be forthcoming even if the ordering deadlines are not met, WPB stated that orders placed after these deadlines would receive every consideration. However, manufacturing schedules will be established on the basis of orders received and late orders would be fitted into the production schedules.

In addition to permitting a much more accurate estimate of requirements, it is believed the directive may permit establishment of a system of direct allocation. The directive affects only the requirements for completion of existing contracts, as it is impossible to determine what will be needed for contracts not yet placed.

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675,000 STEEL INDUSTRY WORKERS SALUTE

The splendid results achieved by the public in the scrap-metal drives are being manifested 24 hours a day, seven days a week, in the production of more and more fighting steel by America's army of steel workers.

However, need goes on for more scrap to keep war-steel furnaces up to full production. The metal in community salvage piles is being steadily hauled away and prepared by dealers for use in the steel works. Your local scrap heaps are reservoirs that must be kept filled and scrap collections should go on, month

FROM AN ORIGINAL DRAWING BY ORISON MACPHERSON

130 MILLION AMERICANS

after month. The neighborhood scrap piles should not be regarded as unsightly, but as something in which you may take pride as symbols of America's fighting spirit.

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CONTROLLED QUALITY STEEL FOR WAR

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SCRAP FOR WAR STEEL

Open-hearth stockyard in steel mill (illustrated at left) is where your iron and steel scrap, conditioned by scrap dealers and purchased from them by the carload, is received in the steel works and inspected by experts before being charged into the furnaces. Here in the millyard the boss is showing some youngsters how the scrap they collected and sold to dealers is picked up by an electric magnet and deposited into metal charging boxes on a low-built charging car. The car will convey the boxes to the open-hearth floor. Here a charging machine will pick them up one at a time and dump their scrap contents deep into the fiery bath of the steel furnace, to become fighting steel for American and Allied fighting men to win to victory.

Scrap dealers' big job comes after you and your friends have collected your scrap and deposited it on the neighborhood scrap pile. To this come the scrap dealers, 6,500 of them. They haul the material to the scrap yards, big and little. Here it is carefully assorted, so that nothing that is deleterious to finest quality war steel shall get by. Then it is graded into about 75 classifications according to intended use. Big alligator shears chop up some of it. Larger pieces are flame-cut to furnace sizes. A lot of it is squeezed by giant presses into bundles. Many millions of dollars of equipment especially for preparation of scrap is used by American scrap yards. It is a big business, a very big and important business, for it locates, purchases, transports, stores, sorts, prepares and ships to the steel plants nearly one-half the material that goes into this country's production of war-steel.

OCD and scrap collection. "The organized and well-directed scrap collection drives put on last Fall by the fire and air-raid wardens and their staffs, and later by the volunteer firemen in many localities has been most helpful to the steel industry," said H. E. Lewis, President of Jones & Laughlin. "Without their well-directed campaigns many steel furnaces would have dropped out of production for intervals, instead of working on as they did to produce 86,200,000 tons of steel during 1942, an all-time high for the whole industry. This year still higher goals have been set and even more intense searching for scrap will go on."

Aliquippa wins award. The highly prized Army-Navy award for excellence in production of steel for war was presented to the several thousands of men and women of Aliquippa Works of Jones & Laughlin Steel Corporation on January 6, 1943. In presenting the "E" flag, Lieut. Colonel John S. Swauger, executive officer, Pittsburgh Ordnance district, said: "Only untiring and unselfish teamwork, with both labor *and* management putting their shoulders to the wheel, could have won this award."

New Program Urged For Farm Implements

Chicago

• • • **A new program** for the production of farm implements, more balanced and more adequate than present WPB plans is essential if food production is to be maintained at adequate levels, Fowler McCormick, president of International Harvester Co., said last week in a statement on the farm machinery situation.

Such a new plan is urgently needed to be effective not later than March 15, Mr. McCormick said, if it is to take cognizance of the seasonal factors in farming.

The Harvester company head added that they have always considered the amounts of farm machinery provided for in WPB limitation order L-170 were inadequate to meet farmers' minimum needs.

Recently there have been statements by various government officials to the effect that manufacture of farm machinery and repair parts under L-170 would be accelerated, Mr. McCormick said, and that some additional upward revisions would be made as to specific machines and repair parts.

Immediately following these statements, the company made application for the materials to provide these additional machines, but were informed that the proposed increase would not be available for the first quarter of 1943.

Mr. McCormick pointed out that while a greater part of the company's facilities for producing farm equipment had been converted to war work, some facilities were not adaptable to war work and are still available for the production of essential farm machinery.

Foundry Practice Meeting In Birmingham Set for Feb. 19

Burmingham

• • • **The eleventh** annual foundry practice conference of the Birmingham District Chapter, American Foundrymen's Association, will be held at the Tutwiler Hotel here Friday, Feb. 19. The 255 members of the Birmingham District group make up the only chapter south of the Ohio River.

Speakers will include R. A. Barr, Carborundum Co., refractories division, Niagara Falls, N. Y.; W. D. Moore, president of the American Cast Iron Pipe Co., Birmingham, and Lt. Robert W. Sandelin, Birmingham Ordnance District. Mr. Barr will speak on "Research and Development of High-Grade Refractories"; Mr. Moore on "Conversion from Production to War Work," and Lt. Sandelin on the "Roll of Iron and Steel Castings in Ordnance Material."

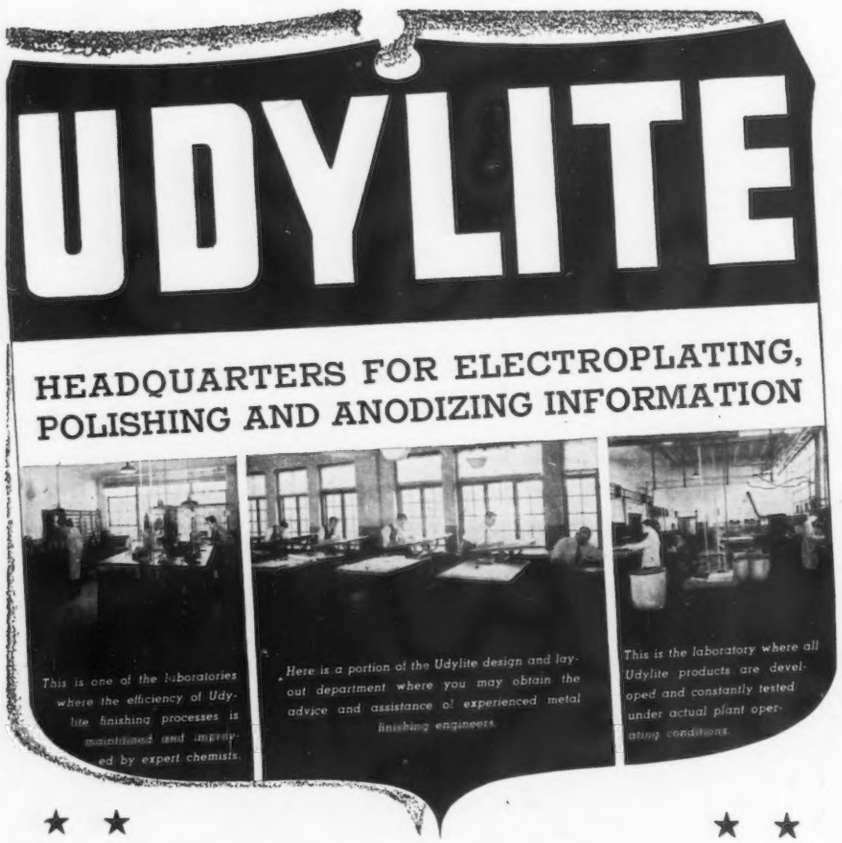
•

Milwaukee Meeting Feb. 18-19

Milwaukee

• • • **The sixth** annual regional foundry conference, under the joint sponsorship of the Wisconsin chapter of the American Foundrymen's Association and the University of Wisconsin, will be held here Feb. 18 and 19 at the Hotel Schroeder.

The conference program will be featured by symposiums on malleable iron and patterns. W. A. Hambley, Allis-Chalmers Mfg. Co., is chairman of the conference.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Miners Threaten War Production; New Wage Formula Seen as Answer

• • • **Biggest production threat** of the week came from the ranks of labor itself via a demand of the executive board of the CIO which would break the "Little Steel" wage ceiling and in the process possibly stop the production of coal after April 1 along with serious impediment of all war production industries which rely on coal. This means all war industries directly or indirectly.

The threat is held mainly in the demands of John L. Lewis, whose miners will be without contracts on that date unless negotiations can be completed between March 14 and April 1 as now scheduled. This is unlikely in the light of past experience and, according to custom and Lewis' ultimatum, miners do not work without contract.

The ugly feature of breaking the "Little Steel", 15 per cent wage ceiling is the fact that the increase this would provide will contribute further to the spiraling of inflation and will only serve as a temporary relief which will create further wage demands at a later date.

On the CIO side of the question, certain arguments are sound in that the 15 per cent basis, applied horizontally, gives the small wage earner a bad deal inasmuch as food costs, which make up a larger portion of his spending, have risen considerably in excess of 15 per cent since Jan. 1, 1941, the date of WLB reckoning.

The effect on inflation can easily be foreseen in that if Director of Stabilization Byrnes allows coal prices to rise to compensate for increased wages, the farm block will insist on parity prices being revised upward, all of the unions will have a better argument for higher wages and with increased production costs arising from costlier coal, transportation and other affected items plus a possible farm price rise, living costs will jump to a new high. Then the same situation again appears and the cycle is ready to repeat and spiral higher. The vicious circle of inflation is being aided and abetted by every move in this direction.

Most likely solution to the problem is one of refiguring the 15 per cent formula to a new figure which will allow only a slight wage rise based on the actual overall increase in living costs from Jan. 1, 1941, to possibly Feb. 1, 1942—a new basis of equity.

Capt. Eddie Rickenbacker, speaking before the Baseball Writers Assn. in New York, came out for a labor draft with the equivalent of military records of behavior for each worker. These records would presumably serve to spur on an earnest worker and act as a deterrent to shirking workers who are causing absenteeism and slowdowns. While Rickenbacker's efforts are very much appreciated around the country, most of his suggestions thus far are to be recorded as thought-provokers.

The CIO executive board announced Feb. 7 that it would initiate conferences throughout industry in an effort to stamp out absenteeism and other industrial ailments needing correction. A recent joint CIO-AFL meeting in Cleveland, convened for this express purpose, ended by deciding that the task was one for the Labor-Management Committees in each plant to work out individually. Talk of union disciplining of absentee members was shunned heartily as this practice might be hard on membership. Illustrating that labor expects to have a decisive finger in the conduct of war production and the peacetime problems to follow, the CIO, AFL and the railroad brotherhoods have established an American Labor Conference of International Affairs. The theme of the endeavor in a nutshell according to the unions is—"Organized labor everywhere must join in this preparatory work in order that, when the time comes, it may not be overwhelmed by forces which have nothing in common with the ideals of liberty, social justice and democracy."

Steel Pay at Peak; Work Week Longer

• • • Steel industries reached a new peak payroll of $129,368,000 during December, 1942, exceeding the previous monthly peak of $126,627,000 reached in October, 1942. Total paid out during 1942 was a record-breaking $1,467,059,000, as reported by the American Iron and Steel Institute.

At the same time the average hourly week was increased. Wage earners in December worked 40.2 hr. per week as compared with 39.4 hr. in November and 38.2 hr. per week in December, 1941. Wage-earning employees in the steel industry earned an average of 109.4c. per hour in December as against 109.3c. per hour in November and 99.9 in December, 1941.

•

War-Job Movement Starts at Very Slow Pace

Pittsburgh

• • • **No heavy movement** of non-essential workers to war industries here was noticeable last week after the WMC edict of "work in war industries or fight." This condition was more or less expected in view of the exceedingly large percentage of war workers to the total employment in this heavily industrialized area. Personnel managers do report an increase in the number of applications over the past week and they believe many non-essential workers are "shopping around" since they have until April 1 before being reclassified.

The rub with many non-essential workers is that they have good paying jobs at present and with lack of previous training on war jobs, they would be forced to take in many instances a somewhat smaller salary or wage. This is given as the reason why there has been no wholesale acceptance of jobs which are now open. A large percentage of the latter here are in the common and semi-skilled labor classifications because most applicants have tried for the higher paid vocational jobs.

Meanwhile authentic reports here indicate that industrial turnover continues high, the drain of manpower into the armed forces is increasing rapidly, certain skilled workers are hard to get, and thousands of men must be interviewed before many are actually hired. The situation is further complicated in the Pittsburgh area since one large new war plant is expected to be in operation by the middle of the year. Some jobs which are classified as war industries, are not producing more than 40 or 45 hours for workers, many of whom are "ditching" these jobs to take others where the pay is higher owing to longer hours and overtime.

Move to War Jobs Draw 100,000

• • • **The announcement** by War Manpower Commissioner Paul V. McNutt this week that dependency deferments for draft-age men in 20 non-deferrable job classifications is expected to mark the beginning of the first concentrated switch-over to war jobs, with as many as 100,000 men in the Cleveland area moving into war plants. Labeled an "excellent move" by Cleveland's manpower chief, Dr. W. P. Edmunds, the plan will undoubtedly get manpower into the war plants and uncover a lot of skilled workers who have heretofore been employed in peace-time work.

The greatest drawback in such a change-over has been that most men are reluctant to leave jobs that they have held over a period of years and at the same time give up what seniority they have gained at the present jobs. However, in listing the non-deferrable jobs, a list that may be expanded momentarily, it apparently becomes a proposition of getting a war job or going into service. The announcement of the WMC did not guarantee that such men who take war jobs would be deferred, but merely stated that their induction was almost a certainty if they remained at their present employment.

A Greater Cleveland "womanpower committee" under the direction of Dr. Edmunds is planning to meet this week to aid government manpower authorities in recruiting housewives for war plant jobs.

Registration Rush Seen Slumping Fast

New York

• • • **At weekend, the rush of registrants here to U. S. Employment offices in compliance with the recent WMC announcement making all men between 17 and 37 eligible for induction regardless of dependents unless employed in war industries, was seen falling off at a fast clip.**

Approximately 75,000 registered here in the first four days, but the rate of application was sinking fast from the 30,000 rate of the first day.

•

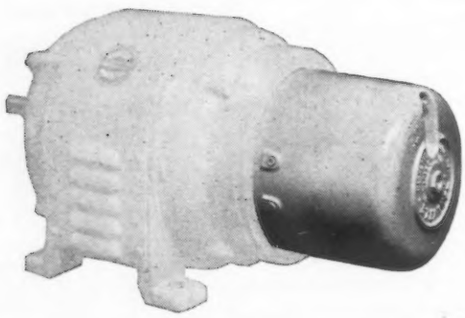
Production Conference For Foremen Opens Feb. 19

Detroit

• • • **Problems of** efficiency, leadership and absenteeism will be discussed in a series of forums Feb. 19 and 20 comprising a War Production Conference for foremen sponsored by the University of Michigan Extension Service and several other groups at the Rackham Memorial Building.

Sessions will be held on the selection and development of foremen, means of relaying instructions to workers, absenteeism, problems arising from the introduction of women into industry, development and advancement of company policies, departmental problems of foreman, and supervisor-worker relationships.

Chairman of the advisory commit-



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The stopping of rotating machinery with Stearns Magnetic Disc Brakes is economically and efficiently solving one of industries' prevailing problems. Simple in design, rugged in construction, machine or motor mounted.

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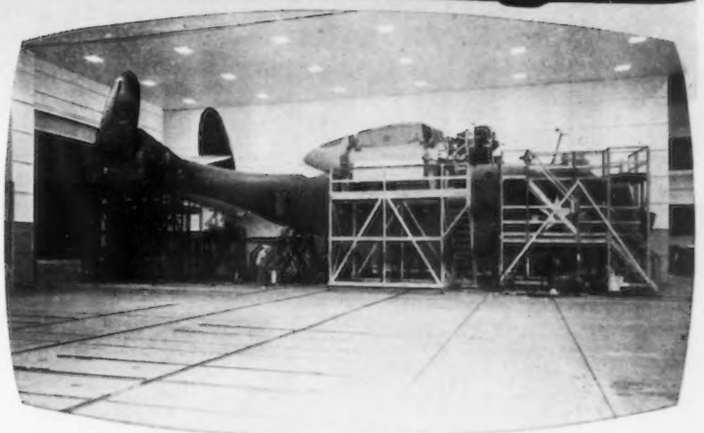
you can't slow down for Painting!



DeVilbiss designs and builds a gigantic spray booth to speed the painting of Martin Bombers

● If we're to sink the Rising Sun, if we're to drive Hitler and his horde from Western Europe, we must mass-produce *all* war materials—including bombers. And we are! At the Glenn L. Martin Company, for instance, the now-famous Martin bombers are being produced at a rate never before dreamed possible.

These huge war birds are, of course, painted by the modern, high-speed spray process—but the ventilation of such an enormous spraying area created a problem. So Martin came to DeVilbiss for the solution.

DeVilbiss engineers designed this efficient 15,200 square foot water wash spray booth to provide the uniform, effective movement of air required for ideal working conditions. It's large enough to accommodate Martin's biggest bombers, wings and all. With its motor driven accordion doors extended it is divided into four sections through which the giant fuselages rapidly move as they receive their interior and exterior spray finish in mass production style.

If *you* are building planes, ships, tanks, camps or factories, making weapons or munitions, applying blackout or camouflage—in fact, *whatever* your war job . . . you can count on DeVilbiss for the time-saving answer to any coating, painting or finishing problem.

THE DEVILBISS COMPANY • Toledo, Ohio

Canadian Plant: WINDSOR, ONTARIO

• • •

THE COMPLETE DEVILBISS LINE CONSISTS OF: Spray finishing equipment • Automatic coating machines • Tanks for spray materials Spray booths and exhaust fans for vapor and dust elimination Air regulators, cleaners and dusters • Air compressors • Respirators Specialized hose for paint, air, water, gasoline, welding and pneumatic tools • Hose connections • Water and oil guns • Equipment to prevent offset in printing • Paint stripers • Medicinal atomizers.

DEVILBISS SPRAY SYSTEMS

tee is B. D. Kunkle, vice-president of General Motors Corp. In charge of program is C. A. Fisher, director of the extension service of the University of Michigan.

Sponsorship of the conference, in addition to the university, is by the National Association of Foremen, the Michigan Foremen's Club, the Michigan Manufacturers Association, Detroit industries, and the Engineering Society of Detroit.

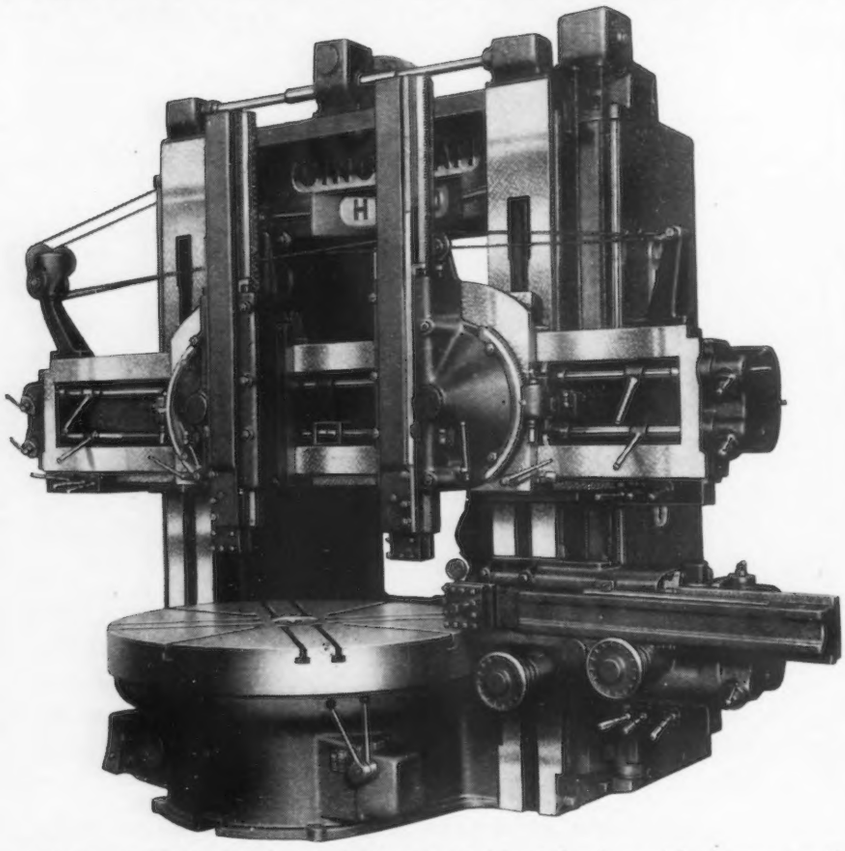
Group Will Assist Army on Its Buying

• • • **The War Department** announced Feb. 5 the appointment of a group of civilians as an advisory committee on matters relating to procurement. The group will recommend any changes desirable and necessary. Those who compose the advisory group are:

John U. Barr, Federal Fibre Mills, New Orleans; C. U. Bay, A. M. Kidder & Co., New York City; Dr. Melvin T. Copeland, Harvard University; Huntington B. Crouse, president, Crouse-Hinds Corp., Syracuse, N. Y.; W. B. Foster, Pressed & Welded Steel Products Co., Brooklyn; Albert Fuller, Fuller Brush Co., Hartford, Conn.; E. T. Gushee, Detroit Edison Co., Detroit; Paul Hoffman, Studebaker Corp., South Bend, Ind.; Ernst Mahler, Kimberly-Clark Corp., Neenah, Wis.; George S. Olive, president, American Institute of Accountants, Indianapolis; David Zellerbach, Crown Zellerbach Corp., San Francisco.

Cincinnati

HYPRO VERTICAL BORING MILL



• This 7′ Hypro Boring Mill has individual feed, rapid traverse and reversing mechanism for each head including the side head. Ask for Bulletin 125 describing features providing accurate and fast turning and boring.

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THE CINCINNATI PLANER CO.

CINCINNATI, OHIO

Wage Floors to Be Set on Metals, Plastics, Machinery

• • • **An industry** committee of 36 persons was recently appointed by L. Metcalfe Walling, administrator of the Wage and Hour and Public Contracts Divisions of the U. S. Department of Labor, to establish a minimum wage rate in the combined metal, plastics, machinery, instrument and allied industries, employing about 7,500,000 wage earners.

In making the appointment, Mr. Walling set a precedent in administering the wage and hour law. Heretofore, industry committees have been set up to study individual industries. Ordinarily, the setting up of a wage-minimum in the metal, plastics, machinery, instrument and allied industries would require the appointment of 15 or 20 committees.

The committee will meet at the Hotel Astor, New York, on Feb. 16, to hear testimony and then to recommend the highest minimum wage rate (not to exceed 40c. an hour) for those employed in the industries.

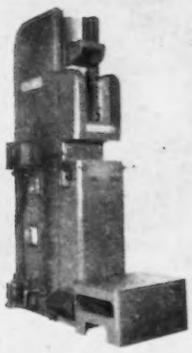
Strike Man-hour Losses Level-off at Year End

• • • Man-days lost from war production by strikes in December maintained November's low level of 3/100 of 1 per cent of total man-days worked, just half the twelve-month average of 6/100 of 1 per cent. While the number of man-days lost rose from 91,925 in November to 119,572 in December, the number of days worked rose at the same time from 350 million to approximately 385 million. The number of men involved in war production strikes in progress in December was 49,375, and the number of strikes in progress during the month was 101.

You CAN pick the wrong Machine

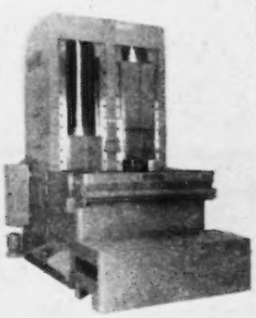
UNIVERSAL HORIZONTAL

"JUNIOR" PRESS



PULL-UP

"SENIOR" PRESS



DUAL RAM

PULL-DOWN

SINGLE RAM

These standard Colonials come in scores of models

How to get more production with your Broaches.....

3. BY PICKING THE RIGHT MACHINE FOR THE JOB

THE very flexibility of broaching machines—the variety of jobs to which each standard "Colonial" can be applied — frequently makes it difficult for the user to select the proper type of broaching machine for a specific operation or group of operations.

Proper machine selection depends primarily on three factors:

1. The nature of the job.
2. The capacity required.
3. The length of stroke needed.

Following are some hints as to selection of the best machine type for different kinds of jobs:

ROUND HOLE BROACHING: Can be handled on practically every type of standard broaching machine except those specifically designed for surface broaching. If parts are extremely large, or floor space is at a premium, a vertical machine is preferable to a horizontal type. If the operation is mainly a "sizing" job, or if the broach is not too large, a "Senior Press" may be used.

If permissible for parts to drop off the broach at the end of the stroke, and not too large to handle properly, a "Pull-up" may be used.

If the parts are too large, or if the part requires accurate locating in a fixture, a "pull-down" may be preferable.

SURFACE BROACHING: In high production, the most suitable machines are Colonial Single and Dual Ram vertical machines. If maximum production capacity is not required, a "Senior Press" may be used on light jobs. Lower production surface broaching operations may also be performed on a "Universal Horizontal" if already available. If automatic indexing is desired, a "Senior Press" or a ram type of machine should be used.

KEYWAYS: While keyways may be broached on vertical machines, it is usually best to use a "Universal Horizontal" for this work in combination with a key-way horn. This type of machine provides greater ease of loading for such work.

HELICAL SPLINES: Best performed on a "Universal Horizontal" in combination with a helical lead bar, providing maximum accuracy and ease of handling. Can also be performed on vertical machines, of course.

The above, of course, is not a complete summary and individual recommendations may differ depending on the nature of the job. As to machine capacity and length of stroke, it is always advisable to obtain the recommendation of your broaching machine and broach producer. Here the best guide is still "experience"—the knowledge acquired from tooling and studying thousands of broaching operations.

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Broaching Machines — *Broaches-Broaching Equipment*

DETROIT..... U. S. A.

Briefly Told—

Lend-Lease to Be Tied To U.S. General Trade, Mass Meeting Is Told

• **Lend-lease now is studying ways and means of more closely tieing in the foreign trade organizations in this country with its operations, a mass meeting of exporters in New York was told last week by Philip Young, deputy lend-lease administrator.**

"Lend-lease is attempting to adjust its operations so as to cause as little harm to the export machinery of the United States as possible," he added.

What hard-facing stands heat best?

Coast Metals Hard-Faced bit at left. Unfaced bit at right.

THIS TONG BIT TEST WILL TELL YOU AT ONLY A FEW PENNIES' COST...

JUST APPLY to one of your stripper or soaking pit tong bits the recommended Coast Metals Hard-Facing. Then do the same to the other bit. But here use some other brand of hard-facing metal. Or, if you prefer, leave this second bit uncoated.

Result: You'll find Coast Metals *wins in lengthening tong bit life* at high temperatures. In one case, Coast Metals hard-faced bits pulled 75 heats of 22 ingots, each weighing 4,000 pounds,—a total of 6,600,000 pounds all together. Ordinary bits wore out after two or three heats! In another case, Coast Metals Hard-Facing increased the life of slabbing mill tong bits SIX TIMES!

COAST METALS

hard-facing weld rods

What is *your* wear-resistance problem? Write us and see how Coast Metals Hard-Facing can help you protect your equipment against wear, abrasion, impact, shock! And keep your production running smoothly, without unnecessary time out for repairs or replacements! Get facts today.

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YOUR EQUIPMENT'S LIFE PRESERVER AGAINST WEAR

• **One of the minor miracles** of war time conversion is the record established by the Michael Yundt Co., Waukesha, Wis., for 26 years a manufacturer of bottle washers and pasteurizing machinery for the dairy, beverage and brewery industries, and now approximately 100 per cent in war production. When the company received orders early in 1942 to start the manufacture of shells it had very little equipment that could be used. By June the enlarged plant had started; first shipments were made in July.

•

• *Fuselages for aircraft will be manufactured by the Cockshutt Moulded Aircraft Ltd., a new subsidiary of the Cockshutt Plow Co. Ltd. at Brantford, Ont. The new company will manufacture plastic, moulded, bonded, plywood fuselages. The working staff is expected to reach* 1200.

•

• **Aviation practice** is apparent in the design of engines for vehicles now being built for White Motor Co., Cleveland. The sodium cooled valves, faced with stellite, and the special copper lead alloy bearings are similar to those found in present American aircraft engines. In connection with the alloy bearings, Indium treatment is introduced to counteract the effect of various grades and kinds of oil.

•

• **To meet the increasing demand for zinc, Sherritt Gordon Mines, Toronto, proposes to bring the daily tonnage of its mines at Flin Flon in Northern Manitoba from 2500 tons to 3000 tons, providing labor is available. Under new United States contracts the company plans to ship about 3000 tons of 50 per cent zinc concentrate monthly.**

•

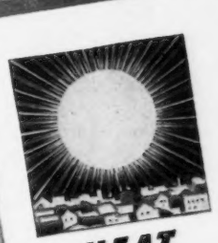
• **Less than two per cent** of all industrial laboratories are now completely available for research on war problems, and more than two-thirds have less than a quarter of their capacity available. This report was made by Dr. Harvey N. Davis, Director of the Office of Production Research and Development of WPB, after a nation-wide canvass. All the larger industrial research laboratories are carrying heavy war research loads.

•

• **Since the outbreak of war,** 3700 defense construction contracts have been placed in Canada for the three armed services, calling for the expenditure of upwards of $355,000,000, the Department of Munitions and Supply announced. Most of the work carried out to date has been for the Royal Air Force and Combined Training

Weather-Tested

against HEAT



MOISTURE

COLD

ACID FUMES

APS

ROOFING • SIDING • FLASHINGS

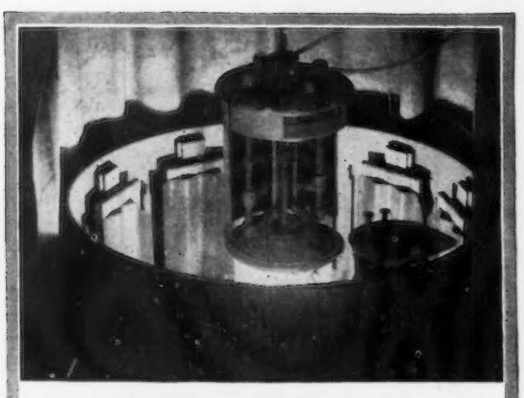
The wide acceptance of A P S Roofing, Siding and Flashings is indicated by the large number of outstanding industrials who have bought it repeatedly for uses under the most extreme corrosive conditions.

A P S Sheets have been *Weather-Tested* by Pittsburgh Testing Laboratories, and the results prove the value of the *Weather-Tested Coating*, an exclusive feature of A P S.

A P S is available through your local jobber. Ask him. If you cannot secure, write us direct.

PROTECTED STEEL PRODUCTS CO.

General Office and Plant, WASHINGTON, PA.



WEATHER-TESTED FOR EXTREMES — Here, in the Weather-Ometer, A P S panels were exposed to arc-light at temperatures up to 140°F., and then tested in cold-box at 10°F. below zero!

Asphaltic-coated sheet subjected to accelerated weathering. After 86 days definite rusting occurred.

Regular **APS** sheet subjected to 135 days' accelerated weathering. No checking, cracking or failures of any kind were found, only a slight dulling of the coating.

Triple Protection

1. Steel protects the structure
2. *Weather-Tested* compound protects the steel
3. Mica protects and reinforces the *Weather-Tested* compound

Send for this Engineers Handbook

program. This includes some 2000 buildings. More than 560 hangars have been built; nearly 200 airports have been completed. A large amount of work also has been done for the Army and Navy, together with construction of extensions to aircraft manufacturing plants.

•

• **U. S. Steel Corp.** reported recently that 2,214,777 shares, or 24.4 per cent of the 8,703,252 common shares outstanding as of Dec. 31, 1942, were held in broker's names as of that date.

•

• Because of the impossibility of obtaining steel through allocation by the WPB, the Missouri Pacific Railroad and three of its subsidiary companies withdrew from the Interstate Commerce Commission applications to issue $4,550,000 of equipment trust certificates covering in part 2350 freight cars, costing approximately $7,620,687. Contracts for the cars, subject to ability to obtain the essential materials, had been let to the American Car & Foundry Co., Pressed Steel Car, Bethlehem Steel and Mount Vernon Mfg. Co.

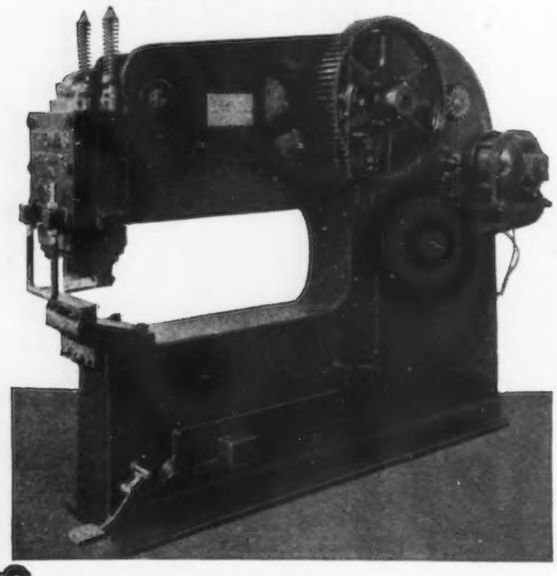
•

• Completion of the world's largest concrete "egg shell" type industrial plant, designed to speed production of war equipment, has been announced by the Westinghouse Electric & Mfg. Co. Built with a minimum of critical materials, the new 1100-foot long transformer tank factory provides more than 160,000 square feet of manufacturing space. The new transformer tank building is a modification of a European structural design, which has many advantages in construction and safety.

•

• *Approximately* 100,000 *ft. of flexible wood pipe, replacing steel, has been installed in drainage culverts, storm sewers and conduits under highways and at army camps, naval stations, airfields and ordnance plants, it was pointed out recently by the WPB Conservation Division. One type of wood pipe is uniquely designed so that it uses only short (almost scrap) lengths of wood.*

Thomas Steel Frame Vertical Punches



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BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS

DESIGNED AND BUILT BY THOMAS

Built in wide range of capacities and throat depths

Favored for use in shipyards and car-shops and wherever steel is fabricated. Equipped with interchangeable tools for punching and shearing.

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MACHINE MANUFACTURING COMPANY
PITTSBURGH, PA.

FABRICATING MACHINERY

OPA Says Price Control Saves $78 Billion War Cost

• • • The nation's expenditures for munitions and war construction—planes, tanks, ships, guns, ammunition and other ordnance—will total about $157,000,000,000 from June, 1940, through the end of 1943 if prices are held at current levels, the Office of Price Administration announced this week.

This is roughly $78,000,000,000 less than the $235,000,000,000 the same volume of war materiel would cost were prices, uncontrolled, permitted to follow the inflationary pattern of World War I in 1914-1918, the OPA estimates.

COMING EVENTS

Feb. 15 to 18—American Institute of Mining and Metallurgical Engineers, New York.
April 7 to 10—Electrochemical Society, Pittsburgh.
April 12 to 16—American Chemical Society, Detroit.
April 28 to 30—American Foundrymen's Association, St. Louis.

Canada Issues Final Steel, Iron Figures

Toronto

• • • **Production** of steel and pig iron in Canada in 1942 exceeded all previous records, while output for December dipped below the record of the previous month. In the closing month of last year 12,000 tons annually were added to Canada's capacity for production of electric ingots and 5875 tons to steel castings capacity, bringing total capacity for ingots and castings to 3,444,775 net tons per year, an increase of 280,775 tons over the 3,164,000 tons reported at the beginning of 1942.

In December pig iron production amounted to 164,382 net tons compared with 170,578 tons in November. The total for the month included 139,388 tons of basic iron of which 5281 tons were for sale; 11,489 tons of foundry iron, all for sale, and 13,505 tons of malleable iron, all for sale. Blast furnaces maintained average daily production in the month of 5626 tons.

All 12 blast furnaces in Canada maintained production in December, 100 per cent rate, using 309,585 tons of iron ore.

For the full year 1942, pig iron produced in Canada totalled 1,975,015 net tons or average for the period of 93.5 per cent of total capacity. Last year's output showed a gain of 29.2 per cent over the 1,528,054 tons produced in 1941. Output in 1942 included 1,645,847 tons of basic iron of which 56,070 tons were for sale and the remainder for use of producers; 159,979 tons of foundry iron, all for sale, and 169,189 tons of malleable iron, all for sale.

Output of ferro-alloys in December rose to 19,567 net tons from 16,733 tons in November and compares with 19,986 tons in December, 1941. For the 12 months of last year production totalled 213,630 net tons, against 213,218 tons in 1941, 151,661 tons in 1940 and 85,531 tons in 1939.

Production of steel ingots and steel castings during December was 269,834 net tons, compared with 270,812 net tons in November. Output for the month under review included 253,843 tons of ingots and 15,991 tons of castings.

For the full year 1942 production of steel ingots and castings reached the record total of 3,121,361 net tons, a gain of 15.5 per cent over the 2,701,313 tons reported for 1941; 38.3 per cent above the 2,255,872 tons produced in 1940 and was 137 per cent greater

COOPERATION WINS THE WAR

WOLVERINE SALUTES MEMBERS OF S. A. E.

Probably no organization is more deserving of a salute today than is the Society of Automotive Engineers for its noteworthy contribution to our cause of liberty—which is now being so seriously threatened.

The effects of the work of this mighty organization are being felt everywhere. Composed of a vast membership—10,000 strong—representing the most distinguished engineering talent in the world—the S. A. E., through its many war-activity committees, has been carrying on work which is already evidenced in successes on the other side of the globe.

Even before Pearl Harbor the "S. A. E. War Effort" was extremely active. Today, all projects undertaken at the request of government and military agencies are supervised by the S. A. E. War Activity Council. The S.A.E. War Engineering Board, a supporting technical group of the association, is at present engaged in a comprehensive program of materials conservation. It serves the War Production Board in an advisory and research capacity.

The S. A. E. Aeronautics Division has just completed 60 new and revised standards and nearly 300 material specifications as part of the job of accelerating aircraft production. Other committees are diligently working on important phases of the War Program.

In recognition of all the great accomplishments of this eminent association—and with the absolute confidence that it will continue to render purposeful service to our country—in war or in peace—Wolverine joins the millions of other Americans in saluting the achievements of this great body of men—the S. A. E.

MR. MAC SHORT
President, Society of Automotive Engineers

CALUMET AND HECLA CONSOLIDATED COPPER COMPANY
WOLVERINE TUBE DIVISION
Seamless Copper — Brass
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A LESSON FROM MARS

When Mars invented his foot-powered, auto-watered grindstone he took one of the World's first steps in technology.

Like Mars we must have technological improvements to win the war. Electronics, with its new, secret uses is the nerve center of our armed forces. It will lead to even greater achievements during peacetimes.

War has witnessed marvelous developments in dehydrated foods, in synthetic rubber, in prefabrication, in plastics . . . all of which will influence future standards of living the World over.

* * *

Just as Management Engineering is helping win the war, it will help win the peace.

When the present war broke out, every one of our clients was faced with war contracts . . . problems involving conversion for maximum production in minimum time with existing facilities and without undue expense. Because of experience gained on the fighting fronts, reconversion has been necessary for many of these clients in order to meet improvements in armament and the shifting to new types. It has been our job to help with all of these problems.

It is our hope that we will soon be called upon to reconvert to peacetime production.

Geo. D. Trundle Jr.
President

THE TRUNDLE ENGINEERING COMPANY

Consulting Management Engineering

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than the 1,327,053 tons made in 1939. For the year under review, output included 2,942,921 tons of steel ingots and 178,440 tons of steel castings.

At the beginning of this year blast furnaces in Canada had a total capacity of 2,123,320 net tons yearly, with two additional stacks under construction and expected to blow in this quarter, which will add approximately 500,000 tons to the above total. Steel furnace capacity at the first of this year totalled 3,444,775 net tons annually, made up as follows: Ingots, basic open hearth, 2,765,000 net tons; electric, 407,000 net tons; steel castings, 272,775 net tons.

•

Bessemer Unit Cancelled By Steel Co. of Canada

Toronto

• • • **The Steel Co. of Canada Ltd.** has decided to cancel plans for the installation of a Bessemer converter at its Hamilton works, Ross H. McMaster, president, stated. Work in connection with the installation of the new electric furnace is proceeding but delays due to difficulties in securing the necessary priorities will postpone the start of operations until next spring, he stated. Ingot production has been maintained at capacity and additional supplies of purchased steel since the first of the year have permitted an increase in the rate of finishing operations. The requirements of ore and coal to insure capacity production of pig iron and coke were delivered before the close of navigation.

Mr. McMaster stated that "the year 1942 again established record figures for both production and sales. Although the tonnage of purchased steel available during the last quarter of the year was less than that received in the same period of the previous year, the total dollar sales, excluding coke and by-products, for the 12 months increased 13 per cent over the year 1941 and the tonnage of corresponding finished goods shipped, showed a gain of 18 per cent."

Tass Reports Soviet Steel Mill

• • • **The Russian news** agency this week reported completion of the first section of a new iron and steel works at Chelyabinsk, east of the Ural mountains and far from the war front. This plant when entirely completed will be the Soviet's largest production unit for high quality steel, the report said.

Canada Seen First in Per Capita Output

Ottawa

• • • **Prime Minister** Mackenzie King, addressing the House of Commons, stated "Canada's war production, in proportion to population, can be shown to be greater, relatively, than that of any other country.

"In money value," Premier King stated, "Canada's war production in 1942 had increased some 159 per cent over the year immediately preceding or $2,100,000,000 last year against $800,000,000 in 1941. The number of men and women employed in war industry at the close of 1941 was some 700,000, at the end of 1942 the number had increased to well over 1,000,000.

"Output of corvettes and minesweepers in 1942 was 85 against 74 in 1941; cargo vessels last year numbered more than 80 compared with 1 in the previous year; military aircraft production in 1942 was almost 3800 against 1700 in 1941; armored fighting vehicles turned out in 1942 numbered over 200,000 while 1941 output was less than 120,000."

Production of small arms ammunition in 1942 totalled nearly 1,500,000,000 rounds, which was more than double the output for 1941. Small arms, such as Bren guns, automatic rifles, etc., are being made in Canada at a rate better than one a minute, seven days a week, 24 hours a day. Canada is producing 10 types of guns, including the 25-pounder, naval guns, anti-aircraft and anti-tank guns.

Since 1939 Canada has developed a mercury mine which is the only large one of its kind in the British Empire. Canada produced 95 per cent of all nickel and 40 per cent of the aluminum used by the United Nations, and now has the largest aluminum plant in the world, and is completing the world's largest hydroelectric power development, which will provide additional power for aluminum production. Mineral production last year reached the all time high record of $564,200,000.

Canada's War Output Placed at $3,700,000,000

Ottawa

• • • **Canada's** war production for 1943 is estimated at $3,700,000,000 compared with $2,600,000,000 in 1942 and $1,200,000,000 for 1941, says the Dominion Bureau of Statistics. In addition, the metals, foodstuffs and other products to be exported to the United States and British Empire countries this year are estimated to total $850,000,000.

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—ready for hard work

Pass this word to your men—BEFORE HOOKING UP A CHAIN STRAIGHTEN IT OUT, CLEAR IT FOR ACTION. • Many new men don't know this should be done. • It's easy to handle chain the right way. Right handling results in better performance, longer life, and, above all, safety. • Treat chain right if you want to get the most work out of it, and reduce breakdowns, delays and accidents.

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STRAIGHT — GAS POWERED INDUSTRIAL TRUCKS EXCLUSIVELY — SINCE 1919

Wide World Photos

WARPOWER IN THE WILDERNESS: Arthur O. Hawes, of the Aluminum Co. of Canada, phones an order to expedite work on the huge Shipshaw project on the Saguenay River in Northern Quebec. When completed, the project will have 1,500,000 hp. capacity. Already two generating units are operating.

Special Credits for Mines Tabled by Canadian House

Ottawa

• • • **Agreements between** the Canadian Government and mining companies—providing special tax credits or special allowances for depreciation or depletion under the Income War Tax Act and Excess Profits Tax Act—have been tabled in the House of Commons.

One agreement is with Consolidated Mining & Smelting Co. of Canada Ltd. To fulfill a contract with Metals Reserve Co. in the United States for 10,000 flasks of mercury during 1942 and 1943, Consolidated Mining & Smelting Co. would have to incur capital expenditure of approximately $600,000. The agreement stipulates that a deduction from the company's profits in 1942 and 1943, for purposes of income and excess profits tax, may be made at the rate of $45 for every flask of

mercury exported to the United States up to $300,000 in 1942 and total of $600,000.

An agreement with Falconbridge Nickel Mines Ltd. concerns a contract with the United States to provide an additional 10,000,000 lb. of nickel in matte during 1942 and 1943. The company would have to spend approximately $656,725. Deductions from the company's profits by way of special depreciation allowance would be permitted on this basis: For 1942, 10 per cent of the cost of depreciable assets, not exceeding $65,673; 1943 and 1944, 40 per cent of the cost each year, not exceeding $262,690 yearly; 1945, 10 per cent of the cost but not exceeding $65,672.

Republic Succumbs To Women's Rights

Cleveland

• • • **Permission** was granted to Republic Steel Corp. by NWLB this week to put into effect a new wage scale for almost 400 women learners in the Berger Mfg. Division plant at Canton, Ohio, Lewis M. Gill, regional director of the WLB announced.

The new wage scale comes within the provisions of the board's General Order No. 16, which provides that "adjustments which equalize the wage or salary rates paid to females with the rates paid to males for comparable quality and quantity of work on same or similar operations" are permissible without board approval provided the adjustments are reported to the board and will not affect price ceilings.

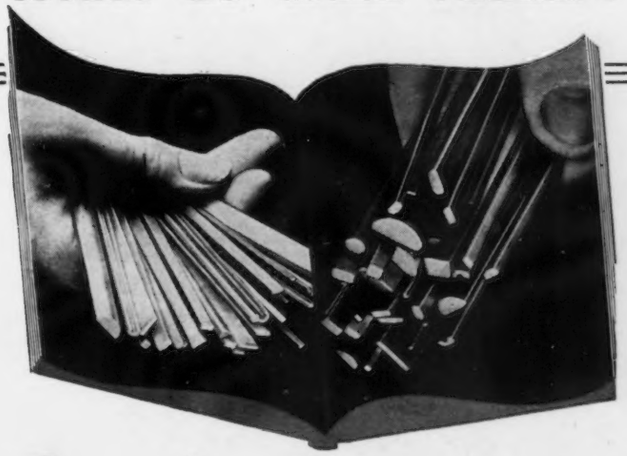
The new rates, contained in a collective bargaining agreement between Republic and the CIO-USWA provide for an increase of 4.5c. an hour after the first month and 5c. an hour after the second month for women. The old rate called only for a 6.5c. an hour increase after the third month.

Frank Vigor, WPB, Resigns

Washington

Frank Vigor, assistant director of the WPB Steel Division, has resigned it was learned on Tuesday. Mr. Vigor, who is transportation manager for the American Rolling Mill Co., expects to return to that position shortly. He will be succeeded by Carl Meyers, manager of the Republic Steel Corp. Central Alloy District. Mr. Meyers will take over Mr. Vigor's duties with respect to raw materials.

WHAT OF WIRE TODAY?



Yes! WHAT OF WIRE?

There is little prospect for improvement in delivery or allocation conditions. *Be Scotch as you handle wire you must have.*

FOR SHAPED WIRES it is good sense to use only standard analyses and shapes.

FOR WELDING WIRE, start right by insisting on getting wire of correct analyses, of proper characteristics for the kind of welding you are doing and of the diameter for greatest efficiency—leaning toward larger sizes. Don't permit bending of electrodes. See that there is no wasteful, excess deposit in the weld. Insist that each electrode is used down to the holder.

FOR GENERAL WIRE, eliminate "specials" from specifications if you have not already done so and, again, see that there is no waste.

If we can help, call on us—remembering that the wire needs of the armed forces and those working directly for the war effort have first call, as you would have it.

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Looking down, from grinder head end.

Sav-way
MULTI—PURPOSE
INTERNAL
GRINDER

Grinds ¼ to 18″ diameter holes, up to 9″ deep, straight or tapered. Sav-way grinder offers greater flexibility and will handle a wider range of work than has heretofore been possible on any one machine. Sturdily constructed throughout and suitable for both tool room and production grinding. "Bulletin MI" giving complete specifications sent on request.

Representatives throughout the U. S. A.

Looking from headstock end, guard removed; note step pulleys providing various work head speeds. Headstock may be slid crosswise any desired distance up to six inches.

Front, angle view, work in chuck. Headstock graduated thru 180 degree.

Sav-way INDUSTRIES
★ Machine Tool Division ★
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Trade Notes . . .

Detroit Rex Products Co., manufacturers of solvent degreasers and metal washing equipment, recently announced the establishment of two new offices. The North Central Region, which includes the entire state of Michigan except the upper peninsula, has headquarters in Detroit. R. W. Pflug, who is in charge, also supervises the handling of large national accounts whose home offices, including purchasing and control, are in Detroit. W. F. Newbery is manager of the South Central Region which comprises the states of Ohio, Indiana and Kentucky. Offices for this territory were recently established in the Mutual Home Building, Dayton, Ohio.

•

Apdite Gage Co. has opened a new plant at Oakman Blvd. and Ruby Avenue, Dearborn, Mich., containing 4600 sq. ft. of floor space. The concern makes gages and instruments.

•

Carhoff Co., 3050 Kensington Road, Cleveland, has appointed the Boyer-Campbell Co., 7540 Antoine Street, Detroit, as one of their distributors.

•

Oil City Tank & Boiler Co., Oil City, Pa., has changed its name to Electroweld Steel Corp. There have been no changes in management or directors. The product of this company has been discontinued permanently and the entire manufacturing facilities are now devoted to the production of Electroweld Tubing.

•

MacFarland, Aveyard & Co., Chicago, have opened branch offices in the RCA Building, Rockefeller Center, New York.

•

American Engineering Co., Philadelphia, has appointed the American Equipment Co., 5928 Second Boulevard, Detroit, as their representatives for Hele-Shaw pumps in Michigan.

•

Acme Steel Co., Chicago, has assumed the distribution and sale of Champion Carton Stitchers and parts, according to an announcement made by Hoffert Machine Co., Inc., Racine, Wis.

•

J. & L. Steel Barrel Co., a subsidiary of Jones & Laughlin Steel Co., Pittsburgh, has purchased the factory and office building at the northeast corner of Seventh and Victor Streets, St. Louis, from the Wackman Welded Ware Co., and will continue to manufacture steel barrels there.

•

General Motors Corp., Detroit, has made an offer to stockholders of Yellow Truck & Coach Manufacturing Co. to acquire all the shares of the latter concern. At present General Motors owns 71.9 per cent of the preferred stock of Yellow and 32.5 per cent of the common stock.

•

Budd Induction Heating, Inc., Detroit, a subsidiary of Budd Wheel Co., has gone into full production in a new plant at 11811 Charlevoix Avenue. The company is making induction heating equipment. The four-story structure is built of brick, concrete and glass. Facilities include machines for heat-treating on a production basis, an electrical assembly room for construction of heat-treat heads, and a large machine shop as well as a heat-treating machine assembly floor.

•

Circle Tip Tool Co., Inc., has moved to larger quarters at 65-67 Colden Street, Newark.

•

Wilson-Brown Co., 405 Lexington Avenue, New York, has changed its name to Harrington-Wilson-Brown Co. with Dan Harrington holding the controlling interest.

Cited for Award

• • • **The following plants have recently been awarded the Army-Navy "E" in recognition of outstanding performance on war work:**

Cleereman Machine Tool Co., Green Bay, Wis.

Cleveland Automatic Machine Co., Cleveland.

Hyatt Bearings Division, General Motors Corp., Harrison, N. J.

Crane Co., Chicago.

Atlas Imperial Diesel Engine Co., Oakland, Cal.

Field & Flint Co., Brockton, Mass.

Glamorgan Pipe & Foundry Co., Lynchburg, Va.

Parke, Davis & Co., Pharmaceutical Plant, Joseph Campau at River, Detroit.

Scholl Mfg. Co., Inc., War Production Department, Chicago.

United States Machine Corp., Plant No. 2, Lebanon, Ind.

Webber Gage Co., Cleveland.

A. B. Zukert Co., Milwaukee.

Fidelity Machine Co., Philadelphia.

Bryant Heater Co. of America, Cleveland.

Revere Copper & Brass, Inc., Michigan Division, Detroit.

Fairbanks, Morse & Co., Beloit, Wis., Freeport, Ill., and Three Rivers, Mich.

Defense Plant Corp. Approves More Contracts

Washington

• • • **Defense Plant Corp.,** RFC subsidiary, has authorized the following contracts:

Chrysler Corp., Detroit, to provide additional plant facilities in Illinois at a cost in excess of $16,900,000, making a total commitment of more than $173,000,000.

Ken-Rad Tube & Lamp Corp., Owensboro, Ky., to provide plant facilities in Indiana and Kentucky at a cost in excess of $1,300,000.

The Wellman Engineering Co., Cleveland, to provide additional equipment for a plant in Ohio at a cost in excess of $70,000, making a total commitment of more than $530,000.

Towmotor Corp., Cleveland, to provide additional equipment for a plant in Ohio at a cost in excess of $39,000, making a total commitment of more than $288,000.

St. Lawrence Corp., Newfoundland, Ltd., New York, to provide machinery and equipment for a plant in Newfoundland.

Kentucky River Distillery, Inc., Louisville, Ky., to provide equipment for a plant in Kentucky.

Republic Steel Corp., Cleveland, to provide additional facilities at a plant in Illinois at a cost in excess of $23,000,000, making a total commitment of more than $79,250,000.

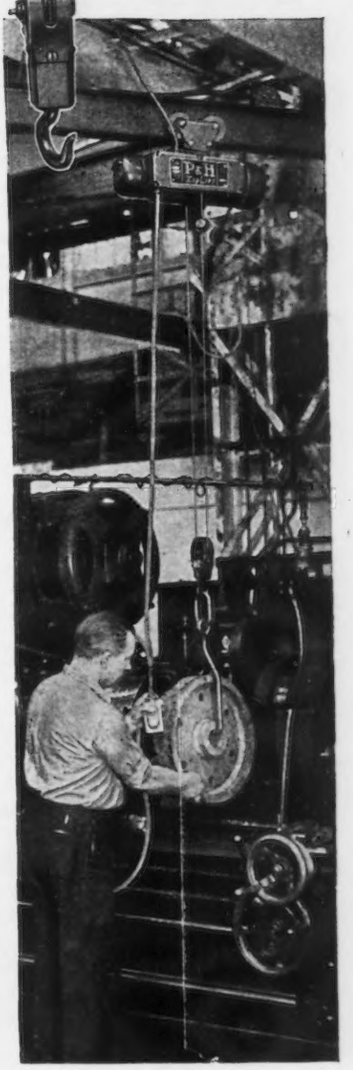
Unitcast Corp., Toledo, Ohio, for additional plant facilities at a plant in Ohio at a cost in excess of $250,000, making a total commitment of more than $3,750,000.

Lawrence Engineering & Research Corp., Linden, N. J., to provide additional equipment for a plant in New Jersey, making a total commitment of more than $1,600,000.

Frank Kent Mfg. Co., Fort Worth, Tex., to provide equipment for a plant in Texas.

CAPACITIES:
250, 500, 1000 and 2000 Pounds

MULTIPLIES YOUR MANPOWER



Saves Skilled Labor—With Zip-Lifts, machine operators can handle and position their work more quickly and accurately. Both men and machines can produce more.

Speeds Production—By keeping materials moving along at double-quick time. "Thru-the-Air" handling with a Zip-Lift eliminates aisle congestion and prevents accidents.

Relieves Worker Fatigue — One man, with only one hand on the magnetic push-button control, can operate this hoist — leaving one hand free to guide the load.

LOOK WHAT YOU GET IN A ZIP-LIFT

Full magnetic push-button control, real wire non-spinning cables, three-way interchangeable mounting, safety type limit switch, double safety brakes, all-weather fully-enclosed housing. These and many other features make Zip-Lift your best buy in electric hoists. Literature on request.

Awarded the Navy "E" for excellence in war production, P&H displays it also as a pledge of future effort.

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CMP . . Limitations on Warehouse Sales

• • • **CMP Regulation No. 4,** to govern sales of aluminum, copper and steel by warehouses and distributors, was issued Feb. 6 by the War Production Board. The new controls become effective Feb. 15 in the case of copper and March 31 in the cases of aluminum and steel.

Procedures to be followed by warehouses and distributors in marketing the three controlled materials are specified in detail. A summary of these procedures follows:

Steel

After March 31, a distributor may fill delivery orders for steel only when the order is an authorized controlled materials order; an order in the amount of $10 or less; an order bearing a preference rating of AA-5 or higher, on which delivery is made prior to July 1, 1943; an order calling for delivery of carbon steel authorized under Food Production Order B of the Department of Agriculture; orders calling for delivery during any calendar quarter to the same customer in amounts not exceeding those listed in a table contained in the Regulation.

Distributors must fill authorized controlled materials orders to the extent of available stocks, subject to the following:

A distributor must reject any order calling for delivery at one time to the same customer, at any one destination, of 40,000 pounds or more of steel, unless the order includes 10 or more individual items none of which weighs more than 8000 pounds, or unless all items covered by the order consist of oil country tubing, casing or drill pipe.

A distributor who is of the opinion that the filling of any authorized order would deplete his stocks to a point where his function in the distribution system would be impaired, may apply to WPB for authority to reject the order.

Copper

Commencing Feb. 15, a warehouse may fill an authorized controlled materials order, or an order bearing a preference rating of AA-5 or higher, for brass mill or wire mill products, if the order calls for the delivery of 500 pounds or less of any item to any one destination at any one time. No more than 2000 pounds of any one item may be delivered to a customer during a calendar month. All orders must be accompanied by a prescribed certificate, signed by the person placing them.

Aluminum

A distributor is required to fill authorized controlled materials orders, except that he must reject any order which calls for delivery of aluminum, to any one person at any one time at the same destination, of more than the following amounts:

500 lb. of any gage, alloy and size of aluminum sheet.

300 lb. of any alloy shape and size of aluminum wire, rod or bar.

200 lb. of any alloy size and shape of aluminum tubing, extrusions or structural shapes.

If, however, a distributor has asked the mill supplying him to fill orders for larger amounts, and the mill has advised him to fill them from stock, he may deliver up to the following amounts:

2000 lb. of any gage, alloy and size of sheet.

1000 lb. of any gage, alloy and size of wire, rod or bar.

500 lb. of any alloy, size and shape of aluminum tubing, extrusions and structural shapes.

An authorized controlled materials order is defined in the regulation as one so designated by any WPB regulation or order, or one endorsed with an allotment number and accompanied by three copies of Form CMP-6, in the case of brass or wire mill products, or two copies, in the case of aluminum. A delivery order for steel must be endorsed with the appropriate allotment number but need not be accompanied by Form CMP-6.

A special provision of the regulation requires that authorized controlled materials orders bearing AAA ratings be given preference over any other order, regardless of time to receipt.

New Version of Regulation 1 Effects Two Major Modifications

Washington

• • • **Following announcement** by Ferdinand Eberstadt, WPB program vice-chairman, earlier in the month, that accounting requirements under CMP would be substantially simplified, WPB on Monday issued an amended version of CMP Regulation No. 1, putting the changes into effect.

Allotments of controlled materials are to be made on a quarterly basis instead of monthly, as previously announced, and the method of passing on allotment numbers from prime contractors to subcontractors has been greatly simplified by permitting the grouping of allotment numbers under major program numbers.

Although controlled materials consumers will now receive their allotments on a quarterly basis, the regulation includes a safeguard to assure that orders placed with mills will not be concentrated in the first part of the quarter. Subject to certain exceptions, persons who receive allotments must not call for delivery from the mills of more than a third of an allotment in the first month of the quarter, and an aggregate of two-thirds in the first and second months of the quarter.

Of particular interest to manufacturers of Class A products is the revision of procedures to govern grouping of allotments by a contractor when passing on to his secondaries authorizations to purchase controlled materials. The amendment greatly broadens these provisions, doing away entirely with the quantitative limitations formerly placed on totals which might be "basketed." Under an abbreviated identification number, a consumer of controlled materials operating under several authorized production schedules may combine in a single allotment to a secondary consumer the requirements for any number of schedules identified by the same major program number.

The abbreviated allotment number

Established by New Regulation . . CMP

provided for by the amendments will serve to identify major programs by the use of the claimant agency letter symbol, followed only by the first digit of the program number and the number indicating the calendar quarter in which delivery is to be made.

For example, in the case of an allotment from a claimant agency to a prime consumer of controlled materials, designated W-2345-678-16, the allotment to the secondary consumer will be simply W-2-16, denoting an allotment for Major Program number 2 of the War Department for delivery of controlled materials in the second quarter of 1943. As the total number of programs for which accounting will be required has been reduced, by agreement with the claimant agencies, to substantially less than 100, internal bookkeeping of users of controlled materials will be greatly simplified. Clarification of a number of minor provisions of the original regulation are included among the amendments.

Meanwhile, WPB on Tuesday issued CMP Regulation No. 3 pertaining to use of preference ratings under CMP. The regulation provides that a delivery order bearing a preference rating with an allotment number or symbol is (unless otherwise ordered by the Director General for Operations) deemed superior in rating, for purposes of Priorities Regulation 1, to any delivery order bearing a rating of the same grade without an allotment number or symbol. It is not superior to another order bearing a rating of a higher grade. For example, a rating of AA-2X with an allotment number or symbol is superior to another rating of AA-2X without an allotment number or symbol, but is inferior to any rating of AA-1 with or without an allotment number or symbol.

In each case when an allotment is made to a prime consumer making Class A or Class B products and his production schedule is authorized by a claimant agency or an industry division, a preference rating will be assigned to such schedule for use with the allotment number applicable to the schedule.

In each case when an allotment is made to a secondary consumer making Class A products and his production schedule is authorized by the consumer making the allotment, the consumer making the allotment shall apply or extend to such production schedule the same rating as he has received for his own related production schedule for use with the appropriate allotment number.

• • • Makers of Class A and Class B products must comply with the requirements of CMP Regulation No. 1 with respect to rejecting orders in excess of capacity and if unable to fill all orders which they have accepted, they must report for instructions as provided but until otherwise instructed they shall fill orders in accordance with preference ratings as provided in Priority Regulation No. 1.

A prime or secondary consumer who has received a preference rating for an authorized production schedule as provided in this paragraph may use the rating with the appropriate allotment number, only to acquire production materials in the minimum practicable amounts required to fulfill such schedules, or to replace production materials in his inventory, subject to the restrictions of paragraph (C) (2) of Priorities Regulation 3. He may not use such rating for any other purpose. Prime consumers making Class B products may not extend customer ratings to replenish inventories.

A prime consumer who manufactures Class B products and has received an authorized production schedule for such manufacture, accompanied by a preference rating to be used with his allotment number, shall not extend any other rating received by him from a customer, except that if a delivery to be made by him is rated AAA, he may extend the rating to the extent necessary to obtain production material required to fill his AAA order, but may not extend the same for purposes of replenishing his inventory.

Each prime or secondary consumer shall place on each rated delivery order for production materials, required to fulfill his authorized production schedule of Class A or Class B products, his allotment number with the following certification:

"Preference Rating (blank) allotment number" (blank) the undersigned certifies, subject to the criminal penalties for misrepresentation contained in Section 35 (A) of the United States criminal code, that he is authorized under CMP Regulation No. 3 to apply or extend the above preference rating and allotment number or symbol to the delivery of the items covered by the attached delivery order."

A person placing a rated order for maintenance, repair or operating supplies under CMP Regulation 5 should place thereon the allotment symbol MRO with the certification required.

A person placing a rated small order for Class A products pursuant to CMP Regulation 1 shall place thereon his allotment number and the symbol SO plus his certification.

No person may place any allotment

WAR EXPENDITURES THROUGH 1943
(Munitions and War Construction Only)
$157 Billions
$235 Billions
$78 Billions
IF PRICES ARE HELD AT PRESENT LEVELS
IF PRICES WERE ALLOWED TO FOLLOW WORLD WAR I TREND
SAVINGS THROUGH PRICE CONTROL

number or symbol on any delivery order except as required by the foregoing provisions or as specifically provided in any other WPB regulation or order of the WPB. If a person who is not authorized to use an allotment number or symbol receives a rated order with an allotment number or symbol, he may extend the rating, to the extent and in the manner permitted by Priorities Regulation No. 3, but he should not use the allotment number or symbol in extending the rating.

An allotment number consists of the appropriate claimant agency letter symbol followed by the major program number. If the order is placed in connection with an allotment of controlled materials by the purchaser to the seller, the two digits denoting the quarter for which the allotment is valid shall be added as provided in the regulation.

A person who has not yet received his allotment and CMP rating for a particular production schedule may apply and extend other preference ratings for such production to the extent permitted by existing priorities regulations and orders (including, in the case of PRP units, Priorities Regulation 11A regarding transition from PRP to CMP.)

Preference ratings assigned for construction or facilities may be applied or extended in the manner and subject to the restrictions provided in CMP Regulation to be issued.

Authorized controlled material orders placed with controlled materials producers should be accepted and filled by such producers as provided in CMP Regulation No. 1 without regard to any preference ratings applicable to such delivery orders and in preference to all other delivery orders, except as may be otherwise specifically directed. To the extent that controlled materials producers are able to fill orders other than authorized controlled material orders, they shall fill such orders until July 1, in accordance with preference ratings as provided in Priorities Regulation 1 and subject to any other applicable regulations or WPB orders.

Authorized controlled material orders placed pursuant to applicable CMP regulations, with persons who are not controlled materials producers, shall be filled by them without regard to any preference ratings applicable to such delivery orders and in preference to all other delivery orders, except as otherwise specifically provided by WPB in applicable regulations or orders and except that an authorized material order placed with any such person which is rated AAA

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NEW M-5 LIGHT TANK: Newly revealed as an automotive industry product is an M-5 light tank, Cadillac-built. Details on armament, powering and protection are withheld at present. The M-5 tank has been given a good share of the credit for the British drive which routed Rommel across Northern Africa.

'Just a Cottage Small' Lures Women to Jobs

Buffalo

• • • A lathe, a drill press and an inspection machine are being operated daily by women in the front windows of a quaint Cape Cod cottage in the heart of Buffalo's business district. The cottage is the WMC's idea of an ideal place to enlist women as war plant workers, and as a result of the demonstrations of what they can do with machines, many housewives who had no idea of entering a factory have signed up for jobs. The machines, operated a full shift by women in overalls or slacks, will be changed frequently to cover the whole range of mechanical jobs open to females.

shall take precedence over other authorized controlled material orders.

Manufacturers of Class A and Class B products must comply with the requirements of CMP Regulation 1 with respect to the rejection of orders in excess of capacity and in the event they are unable to fulfill all orders which they have accepted, they must report for instructions as provided but until and unless otherwise instructed, they shall fill orders in accordance with preference ratings as provided in Priorities Regulation No. 1.

Requests for Material Are Trimmed by WPB

Washington

• • • Demand in excess of supply for controlled materials in 1943, based on a projection of second quarter CMP estimates for the entire year, will amount to 11,080,000 tons of steel, 384,000 tons of copper and 96,000,000 lb. of aluminum. WPB last Tuesday said that second quarter allotments to claimaint agencies of controlled materials amounted to approximately 17,000,000 tons of steel, 600,000 tons of copper and 600,000,000 lb. of aluminum. The allotments were made exactly in accordance with the time table set forth in the plan when it was announced on Nov. 2.

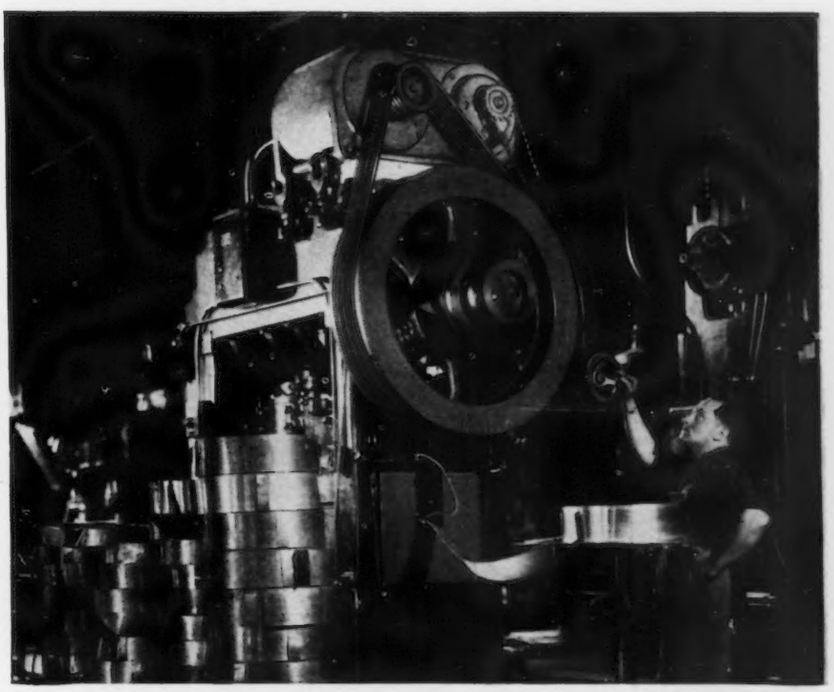
WPB said that overall requests for carbon steel exceeded supply by approximately 17 per cent for carbon steel, 15 per cent for alloy steel, 16 per cent for copper and 14 per cent for aluminum. The amount of alloy steel allotted amounted to about 2,000,000 tons. Programs were adjusted to keep the material budget in balance. In some instances the adjustment was substantial and in others the adjustment was to a smaller degree.

Two points were stressed by WPB Program Vice Chairman Ferdinand Eberstadt, who is also chairman of the WPB Requirements Committee, with respect to WPB judgment of claimant agencies requirements. They were: (1) Programs were kept within the material budget—the total supply available for distribution during the second quarter; and (2) the essentiality of each program to the war effort was weighed and an attempt was made to put first things first.

"One of the major objectives of the controlled materials plan already has been achieved—that is, the presentation by the claimant agencies of their respective programs in advance of immediate need so each can be studied," Mr. Eberstadt said.

Mr. Eberstadt continued with his report on CMP progress:

"Another important objective was



NO TIME OUT
FOR SPEED CHANGES

"Down time" is just as costly to our war production program when it occurs as a natural consequence of inadequate speed control, as when sabotage interrupts the flow of essential production.

We have no time to spare now changing belts and gears, when speeds can be regulated by the simple operation of turning the handwheel of a REEVES Variable Speed Drive, without stopping the machine. If you have a machine in essential production which is not doing its best on account of inflexible speed operation, write, wire or phone us. We build many different sizes of three basic speed control units, thus assuring the correct unit for your individual requirements. Send for copy of new 20-page booklet, "More Output For Defense," which gives 26 helpful examples.

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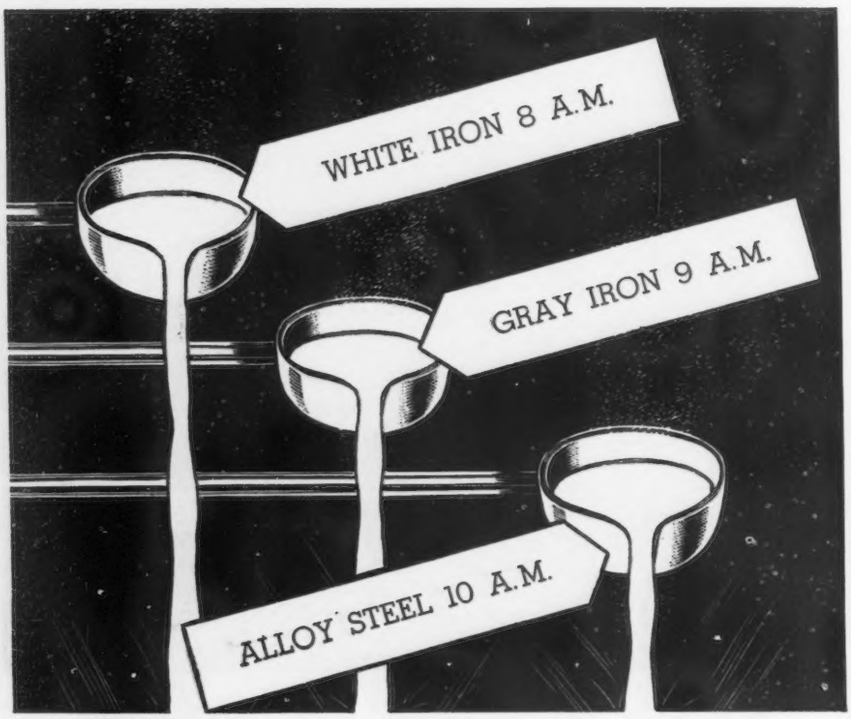
REEVES *Accurate • Variable* SPEED CONTROL

the orderly transition from the PRP to CMP during the second quarter of this year. When CMP was established it was recognized that a number of companies would have to be covered pending their receipt of allotments under CMP. Regulations governing the transition were issued last week. Manufacturers are assured of materials by extending into the second quarter of basic percentage—in most cases 70—of their first quarter PRP authorizations. Other objectives will be reached as the plan is put into further effect. The main purpose of CMP is to assure delivery of material needed to produce approved programs, to deliver it on time and in the exact amount."

Mr. Eberstadt promised to make the procedures for CMP as simple as possible and to eliminate as much paper work as possible. He declared one step in this direction was taken recently when it was decided to make allotments on a quarterly instead of a monthly basis, thus reducing the number of entries by two-thirds.



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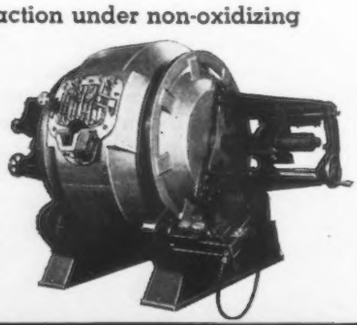

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Price Raised 50c. On Beehive Coke

Washington

• • • **OPA announced** a price raise Feb. 8 of 50c. a net ton on beehive oven furnace coke to enable beehive coke producers of Pennsylvania to meet increased material and operating costs. The action followed an OPA cost survey of more than 60 Pennsylvania producers.

Ceiling prices that result are $6.50 per net ton f.o.b. Connellsville, Pa., for machine-drawn oven coke; and $7.00 per net ton for hand-drawn oven coke for which the total coal supply must be hauled by truck. Transportation costs from Connellsville to the place of delivery, as customarily computed, should be added.

The new price levels are established by amendment No. 4 to revised Price Schedule No. 77 and are effective Feb. 3. Both types previously sold at $6.00 per net ton.

Synthetic Rubber Program Making Satisfactory Gains

Pittsburgh

The synthetic rubber program is now making satisfactory progress and will hit its full stride in 1944, Wm. M. Jeffers, rubber czar, declared here early this week, speaking at the annual banquet of the Engineers Society of Western Pennsylvania at the Wm. Penn Hotel.

Jeffers inspected the Koppers Co. Kobuta Plant near Monaca, Pa., where one of the great plants for the manufacture of synthetic rubber is located. He complimented Wm. P. Witherow, president Blaw-Knox Co., on the engineering work being done.

Scheduling Unit Planned For Each Industry Division

Washington

• • • **The WPB Production** Division plans to establish within every industry division a component scheduling unit. It was disclosed on Tuesday that representatives of companies manufacturing the 32 components declared critical by WPB Production Vice Chairman Charles E. Wilson have been asked to come to Washington. These men, it was said, will integrate all of their company operations through production schedules as though all the components were produced by one company.

Details of Procedure to Govern PRP Units in Transition Period Are Outlined

• • • **Details of** procedures to govern PRP units during the period of industry's transition from PRP to the Controlled Materials Plan in the second quarter of this year were made public recently with the issuance of an amendment to Priorities Regulation No. 11 and a short Supplemental Regulation No. 11A.

Purpose of the transitional procedure is to assure materials to manufacturers pending their receipt of allotments under CMP, by extension into the second quarter of a basic percentage—in most cases 70 per cent—of their first quarter PRP authorizations. After March 31, but not before that date, those PRP units which have not been advised otherwise will be permitted to apply first quarter ratings to the remaining 30 per cent of their first quarter authorizations. The quantities authorized, however, will vary in some cases for particular products or industries.

Extensions of authorizations are automatic, and PRP units will not be required to submit additional PD-25A applications.

Necessity for providing for the needs of manufacturers who might not obtain allotments in time to meet second quarter requirements was foreseen when CMP was announced last November, and a transitional period was provided for. The regulation outlines and provides legal basis for the methods adopted to meet such situations.

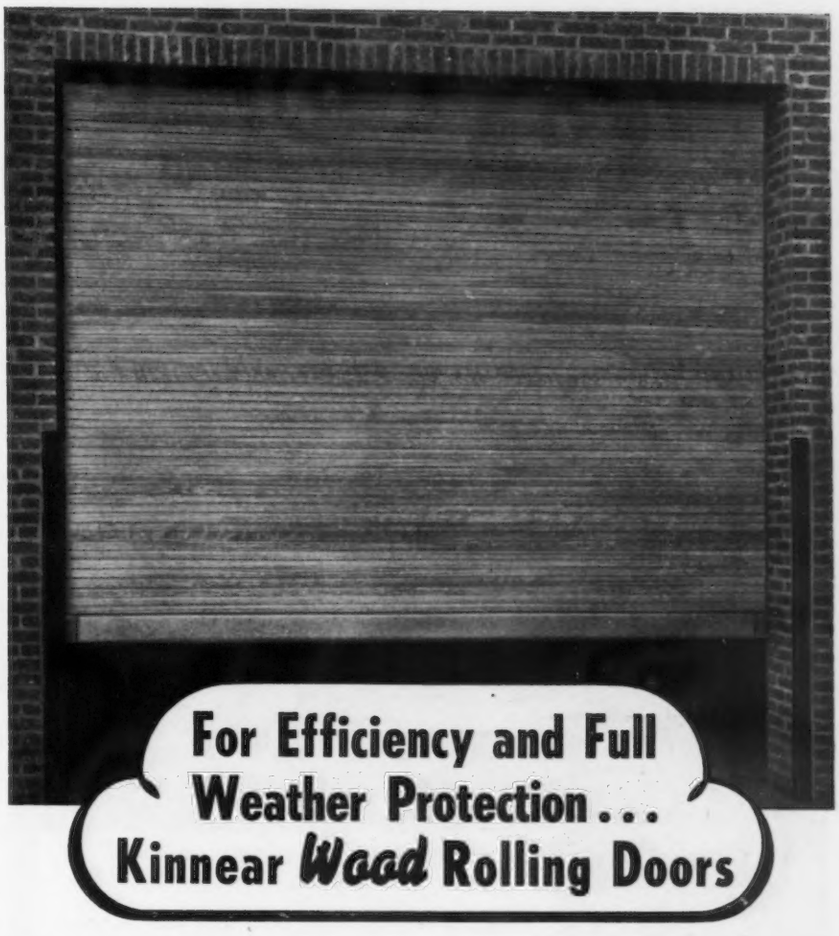
CMP officials pointed out that, although the regulation assures all PRP units ratings for a percentage of their first quarter materials, those who do qualify under CMP will enjoy a substantial advantage in securing materials, as purchase orders bearing allotment numbers will have a preferred status over those bearing preference ratings only.

The text of Amendment I to Priorities Regulation 11 follows:

Section 944.32 Priorities Regulation 11 is hereby amended in the following respects:

1. Paragraph (c) is amended to read as follows:

(c) Every Class 1 producer shall file a PRP application for the first quarter of 1943, except that no application shall be required of any person who becomes a Class 1 producer after Dec. 31, 1942. Applications for the first quarter of 1943 shall be filed not later than Oct. 25, 1942, or in the case of a person who was not a Class 1 producer as of Oct. 15, 1942, as promptly after Oct. 25, 1942, as possible. No person is required to file a PRP application for the second quarter of 1943 or for any subsequent quarter except as specifically directed by the Director General for Operations. The Director General for Operations may specifically require other persons to file such applications from time to time, and may also exempt particular Class 1 producers from the requirements of this paragraph or extend or advance their time for filing PRP applications. Any other processors of materials desiring priority assistance on a quarterly basis may also, with the consent of the Director General for Operations, qualify under the Production Requirements Plan, although



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not required to do so by this regulation.

2. Subparagraph (2) of paragraph (d) is amended to read as follows:

(2) A PRP unit may apply to deliveries of material during the second quarter of 1943 and thereafter, the ratings assigned or permitted in Priorities Regulation No. 11A.

3. Subparagraph (4) of paragraph (d) is deleted.

4. Paragraph (e) is amended by adding the following subparagraph (6):

(6) A PRP unit may, during the second quarter of 1943 and thereafter, accept delivery of listed materials or listed fabricated items to the extent permitted by Priorities Regulation No. 11A.

5. Paragraph (i) is amended to the extent that the first sentence thereof shall read as follows:

(i) Interim procedure. During the interim between filing a PRP application for a particular quarter and receipt of the PRP certificate for such quarter a person may apply or extend preference ratings for delivery during such quarter, and, in case he shall have submitted advance quarter applications, may on or before Feb. 2, 1943, but not thereafter, apply or extend preference ratings for delivery during only the first advance quarter, as follows:

6. Paragraph (j) (3) is amended to read as follows:

(3) No person shall be required by the provisions of this paragraph (j), however, to cancel any order or portion thereof calling for delivery during the first 21 days of November, 1942, or during the first 21 days of January, 1943, of any listed material, if the producer thereof certifies in writing to such person (i) that substitution of other orders, or diversion of the material to fill other orders (even if such other orders call for later delivery or carry a lower rating) is impossible, and (ii) that the production of such material has been completed or that cancellation would disrupt the producer's production schedules and result in substantially diminished production. Nothing herein contained, however, shall relieve a PRP unit from the obligation of canceling or postponing delivery under other orders calling for delivery of similar material during the quarter, as to which no certification is received, to the extent necessary to bring the total receipts of such material during the quarter within the quantities authorized on its PRP certificates.

7. Paragraph (n) is deleted.

Issued this 30th day of January, 1943.

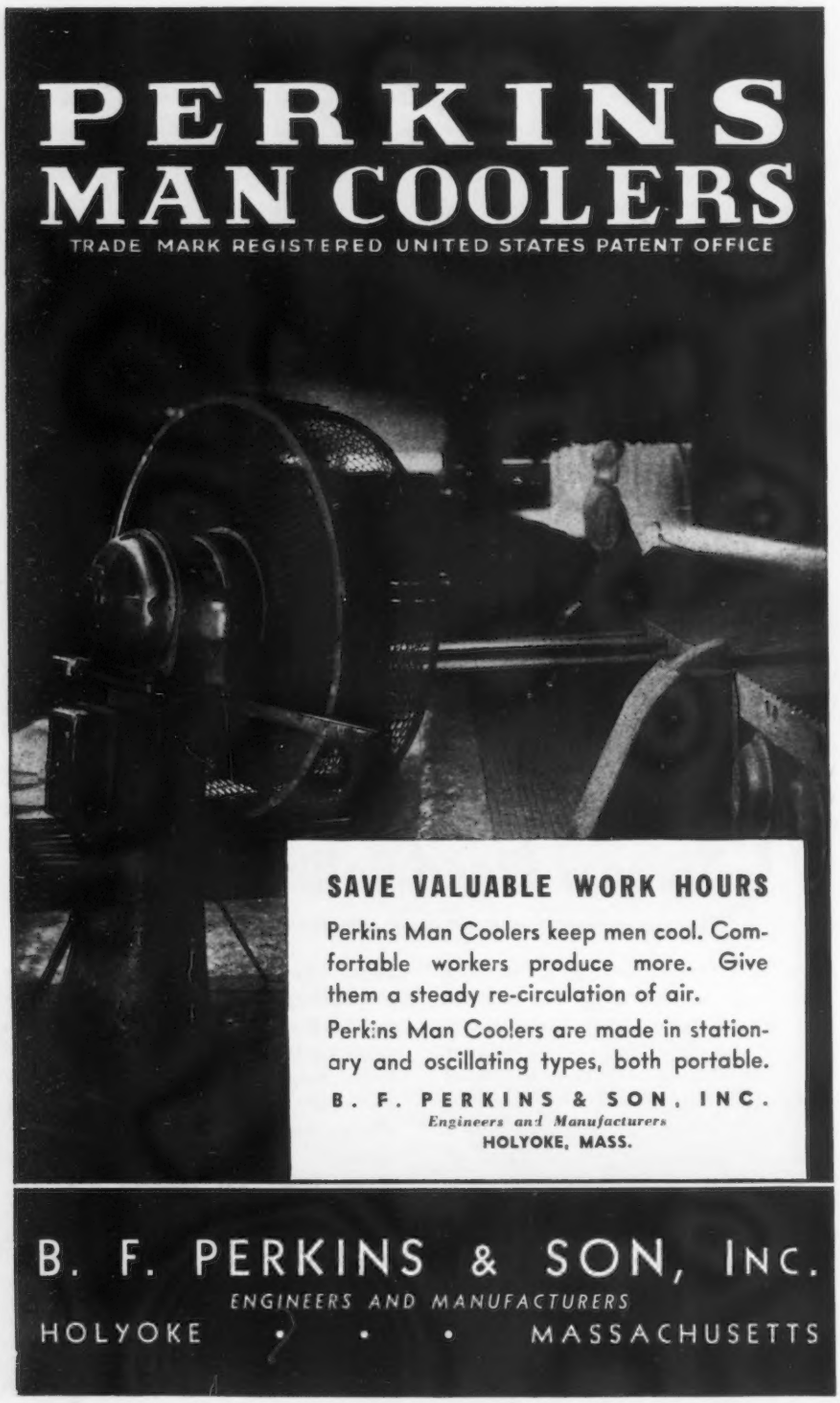
CURTIS E. CALDER,
Director General for Operations.

Wire Binding Released For Use on Light Bundles

Washington

• • • **Restrictions** imposed by Conservation Order M-261 on the commercial use of metal strapping and wire on specified types of bundles were removed under the terms of the order as amended Feb. 4 by the Director General for Operations. No change is made in the restrictions on metal strapping on containers.

Prior to the amendment, the order prohibited the use of metal strapping and wire on light weight bundles. The amendment permits the packing of such products as newspapers, metal pipes, shingles, wood box parts, and knocked-down wooden boxes and similar commodities in light bundles fastened by metal strapping and wire.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WPB Issues Last Call For CMP Requirements

Washington

• • • **The many smaller** manufacturers who have not been operating under PRP have been given a last minute call for the return of applications for second quarter CMP allotments covering steel, copper and aluminum.

In sending out the call B. C. Heacock, WPB Deputy Director General for Distribution, pointed out that it is essential to the successful operation of CMP that all requirements be known to WPB and urged all manufacturers needing them for the production of authorized schedules to file their applications immediately.

CMP application Form CMP-4B, together with instructions for its filing, was mailed to these manufacturers at the same time as to PRP units. Form CMP-4B and assistance in filing it out, Mr. Heacock said, are available at all WPB field offices.

Indications are that a substantial portion of the firms which have been obtaining their materials under PRP will qualify for second quarter allotments under CMP by having their applications on file by the Feb. 9 deadline, it was stated, but that companies which have not in the past been accustomed to estimating their requirements on a quarterly basis are behind time.

•

Limits Modified On Farm Attachments

Washington

• • • **Restrictions** on the production of farm machinery attachments are modified by the provisions of Limitation Order L-170 as amended.

Amendment of L-170, farm machinery order, is designed to permit maximum utilization of basic equipment through granting manufacturers greater leeway in manufacture of types of attachments which permit use of such machinery for different functions, or for different crops. In addition, other phases of the order are clarified through technical amendments.

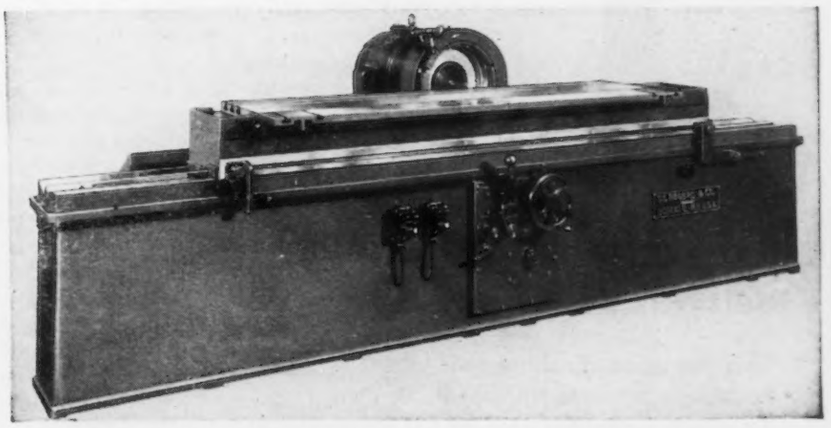
The new provisions give the manufacturer of attachments the option of producing 20 per cent of the total weight of attachments made by him in the year 1940 or 1941 instead of producing according to individual percentages allotted to him in Schedule A attached to the amended order. If he exercises the option, the manufacturer is permitted to spread, as he sees fit, the total of the 20 per cent among the attachments he manufactures.

•

Lead Restrictions Include A-1-j Orders

Washington

• • • **Orders for preference** ratings of A-1-j or higher are no longer automatically exempted from the restrictions on the use of lead imposed by Conservation Order M-38-c, amended last week by WPB. The original intention of this exception was to permit lead to be used where necessary for essential production, such production being then designated by a preference rating of A-1-j or higher. With the increasing assignment of ratings in the AA series, the rating of A-1-j no longer necessarily means a vital war use, and the exemption is therefore deleted.



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L-237 Restricts Light Power Tools

Washington

• • • **Production** and distribution of certain light power driven tools were put under strict control by General Limitation Order L-237, issued Feb. 3 by the Director General for Operations.

The order restricts production of the light power driven tools listed in Schedule A to a 60-day anticipated inventory to meet orders rated A-1-A or higher. Production, however, must not exceed 16⅔ per cent of total 1941 sales by dollar value for any 60-day period. It also restricts all sales, transfers or deliveries (except those from one distributor to another distributor) to orders rated A-1-A or higher. Distributors inventories may not be increased beyond five in number for any specified size and type of tool listed on Schedule A.

The new order does not apply to deliveries made on or before April 4, 1943, to fill existing purchase orders, nor do the restrictions apply to portable tools as defined in the order.

"Light power driven tools" includes both wood working machinery and light metal working tools. Some of these tools formerly came under the general terms of preference order E-1-B. However, it was found in practice that the delivery sequences established under E-1-B did not affect light power driven tools and did not prevent sale by dealers for non-essential use.

•

Calder Picks Assistant

Washington

• • • **Joseph M. Scribner** has been appointed special assistant on the staff of Curtis Calder, WPB Director General for Operations. Mr. Scribner has been director of the Minerals Bureau since Nov. 11, 1942. He was formerly a partner in the firm of Singer, Deane & Scribner, Pittsburgh, and came to WPB in February, 1942, as special assistant to the Deputy Director of the Materials Division. Replacing Mr. Scribner as director of the Minerals Bureau will be Howard Young, who will add this position to his recently announced duties as director of the Mineral Resources Coordinating Division and chairman of the Mineral Resources Operating Committee and the Minerals and Metals Advisory Committee. Mr. Young, of St. Louis, Mo., is president of the American Zinc, Lead & Smelting Co.

Radio Division Gets New Limitation Powers

Washington

• • • **The WPB Radio** Division hereafter will administer three "L" orders previously under the jurisdiction of the General Industrial Equipment Division. These are L-203 covering combat measuring instruments, L-234 covering industrial type instruments and L-134 which limits the use of chromium and metal in controlled valves and regulators.

•

L-89 Amended To Control Elevators

Washington

• • • **Closer control** over the manufacture of elevators and elevator parts, equipment or accessories is established by Conservation Order L-89 as amended recently by WPB. The amended order places all types of elevators in the category of "restricted orders" by redefining the term "elevator." No restricted order may be filled without authorization of the WPB, except for maintenance and repair parts in an aggregate amount not exceeding $500 to remedy an actual breakdown. Changes designed to increase conservation of materials and to facilitate minor repairs are: Parts, equipment or accessories aggregating $25 or less for a single elevator are exempted from the order. Also exempted are elevators, or parts, equipment or accessories to be installed aboard any ship owned or operated by the Army, Navy, Maritime Commission or War Shipping Administration.

Additional restrictions on the use of non-ferrous metals and steel are imposed.

•

65 New Coke Ovens Operating at Gadsden

Gadsden, Ala.

• • • **Republic Steel Corp.** has placed in operation 65 new coke ovens at its Gulfsteel Works here, giving the works 102 ovens in production.

The ovens will furnish ample coke for the company's two blast furnaces at the Gadsden operations. One of the two furnaces, one of the largest stacks in the Southeast, was completed and put in blast last year.

While announcing completion of the coke ovens, E. I. Evans, Southern district manager for Republic, said the new by-product plant was not quite ready for operation.

Safety Valve Order Soon to Replace L-134

Washington

• • • **Because a** limitation order setting standards for safety valves is now being worked out, all reference to such valves has been deleted from Order L-134 which curtails the use of various metals in the category of controlled valves and regulators, WPB said last week. Although manufacturers of safety valves are relieved of obligations created by L-134, WPB officials pointed out that their contracts generally were placed when the order was in effect and that they, therefore, conform to the standards set under it.

The administration of L-134 was recently transferred from the General Industrial Equipment Division to the Radio Division. The manufacture of safety valves, however, will be supervised by the Shipbuilding Division.

•

Dresser Appointed to WPB Construction Division

Washington

• • • **Ferdinand J. C. Dresser,** Cleveland, has been appointed Director of the WPB Construction Division, effective Feb. 13, to succeed William V. Kahler. Mr. Kahler, who has been director of the division since it was established in May, 1942, resigned to return to the Illinois Bell Telephone Co. Mr. Dresser has been in charge of the Engineering Section of the Army Specialist Corps where, holding the rank of colonel, he was responsible for the selection of engineer personnel qualified for commissioning in the Specialist Corps.

•

Service Regulation Clarified

• • • **An interpretation** of Priorities Regulation No. 1, announced last week by the WPB Director General for Operations points out that, inasmuch as the Panama Canal is at present part of the Army and the Coast Guard part of the Navy, each qualifies under provisions applicable to the Army and Navy in various limitation and conservation orders.

•

Tungsten Points Released

Washington

• • • **Because use** of tungsten contact points is controlled more easily through allocation of tungsten rod to manufacturers, the contact points themselves were released from allocation control by WPB in Order M-29, amended last Thursday.

Tungsten contact points are small pieces cut from tungsten rod, used in motors and other electrical equipment. Close control of the use of the metal will be maintained by allocation to manufacturers of the tungsten rod from which the points are made.

•

Value Order Transferred

• • • **The administration** of Schedule II of Order L-42 has been transferred to the Valve and Fittings Section of the WPB Shipbuilding Division. The order, which conserves the use of various metals by standardizing plumbing and heating fixtures and stops, is administered by the Plumbing and Heating Division. Schedule II, administration of which has been transferred, relates to the simplification of grey cast iron, malleable iron, brass and bronze pipe fittings.

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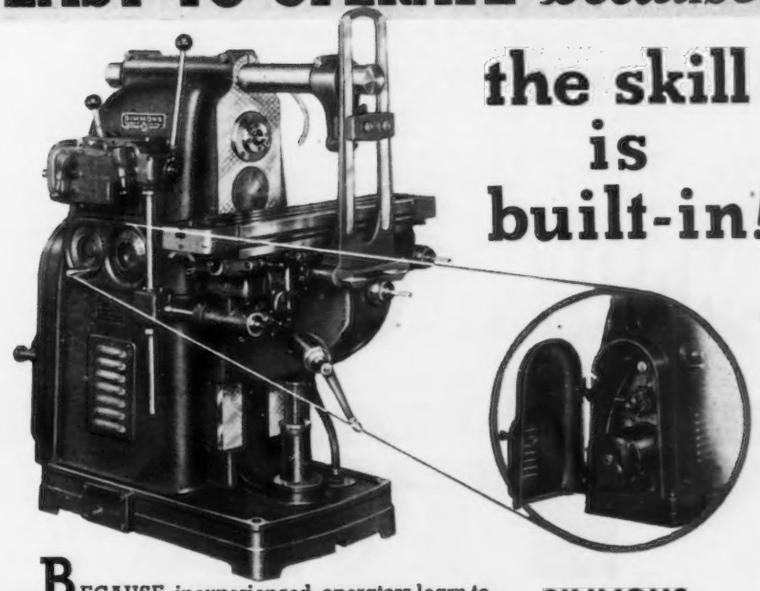

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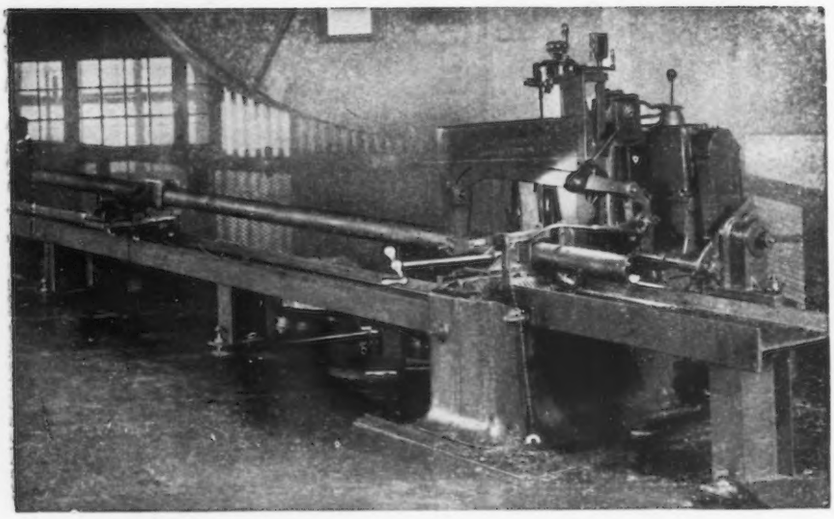

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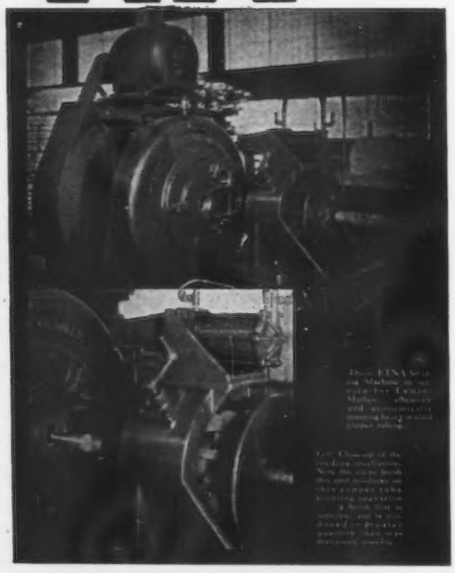
They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points *more* copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from 3/8" to 4" and the experience to help you get the most out of this type of machine.



IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING... "Ask ETNA About Swaging"

ETNA MACHINE COMPANY
TOLEDO OHIO

"Across the Board" Changes in Iron Ore Prices Seen Unlikely

Pittsburgh

• • • **Average prices** paid for iron ore in 1943 will be slightly higher than in 1942, but this will not be due to an "across the board increase" in the existing frozen price levels, according to informed opinion. The higher realized prices will be due to the inclusion of newly mined ores mixed with those having frozen price ceilings.

Agitation for general price increases has made its appearance recently on the basis of increased cost. Iron ore prices were frozen at existing levels early last year. The freezing order at that time was in contrast to steel prices which were placed under a ceiling—steel sold below the ceiling could command the ceiling price if obtainable.

In the case of iron ore, there are many different prices being charged. The freezing order made the going prices for each company the ceilings for that company unless altered by OPA. Opinion is that OPA this year will not permit the changing of any of the frozen price levels except possibly a few which are proved to be too low in special cases, or except those which could be changed because of new mining activity. New mining activity could result in higher average prices to be paid for this year.

In the original freezing order, the OPA allowed ore from new mining projects to be at the maximum price of $4.45 a ton, lower Lake ports. Practically all such newly mined ore, however, has to be mixed with ore coming from mines on which ceilings had been fixed at the prices received when the freezing order went into effect last year.

Generally, the price of a mixture of newly mined ore and ore from the older mines is an average based upon the proper weighting of the amount of old and new ore in the mixture. This weighting is related to the maximum price allowed on new ore and the proper ceiling price on the old ores.

The freezing order last year caught many companies selling ore below the so-called published prices.

While the maximum price of ore was set at the published price, $4.45 lower Lake ports, the average price paid in the industry was $4.336. Individual company prices ranged below and above this average.

New Prices Affect Standard Pipe and Oil Country Goods

Washington

• • • OPA issued Feb. 3 in revised form its price regulation for reusable iron and steel pipe with several changes that conform it more closely to industry practice and an active industrial need for used pipe. New prices are established to make available for reuse greater quantities of used structural pipe and used galvanized pipe.

Other standard pipe is priced specifically, a pricing formula for odd sizes and weights is made more precise, and extra charges and premium qualifications are adjusted.

The order is revised MPR No. 230, effective Feb. 9, 1943. It does not cover cast iron pipe and chrome-nickel stainless steel pipe, but supersedes existing maximum price regulations or revised price schedules, including revised Price Schedule No. 49.

A uniform price of $35 per net ton is set for used structural pipe, with provision of charges for extra service.

Prices for reusable galvanized pipe are advanced from the same level as those for black pipe, to 20 per cent more than black pipe prices for sizes 1 in. in diameter and smaller, and 15 per cent for larger sizes. It was pointed out that the price of new galvanized pipe ranges above the price of standard new black pipe from 13 per cent for large sizes to 45 per cent for small sizes.

Specific maximum prices are set for several standard sizes appearing in the reusable pipe market that were not included in the tables of specific prices in the original regulation, and which formerly had to be priced to the nearest size or weight given in the tables of specific prices. They are listed now in table I and II.

Odd or unusual sizes and weights of pipe, which now are the only ones not included in the tables of specific prices, are to be priced by means of an exact formula keyed to weight.

A pricing method is established also for two grades of oil country casing and tubing known as J-55 and N-80, which are sold at higher prices than other oil country casing and tubing.

Prices for reusable pipe of these grades are set at 10 per cent for J-55 and 22 per cent for N-80. Because the new grades are not easy to distinguish at sight, the seller must make affidavit as to where and when

Manufacturer, in business for over fifty years, with large well equipped shops, located on Eastern seaboard, competent engineering department, National sales connections and ample capital is interested in additional products to manufacture at termination of war on account of greatly enlarged facilities. Plants are completely equipped with highest grade large machine tools, heavy cranes, and suited to precision manufacture and assembly of heavy machinery.

Any proposals made will be given careful confidential consideration.

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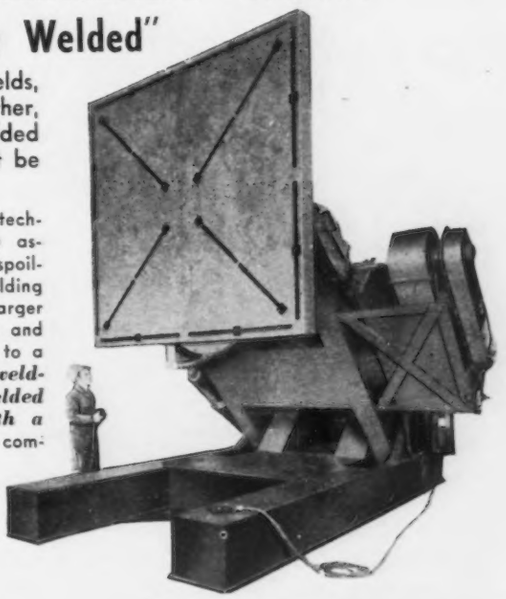
Care *The Iron Age*, 100 E. 42nd St., New York

Today's specifications read . . .

"Must Be Position Welded"

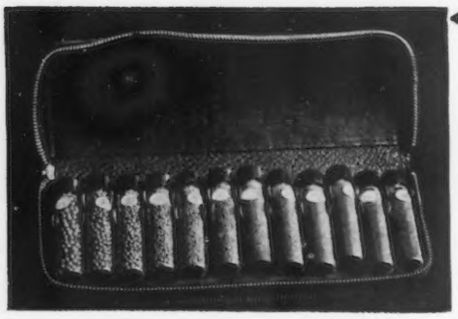
To guarantee flawless welds, stronger unions and smoother, cleaner fillets, buyers of welded products today specify, "must be position welded."

The greatest advance in welding technique, position welding, not only assures a better product but reduces spoilage and rejects, cuts actual welding time by permitting the use of larger rods, and cuts crane, crane crew and welders' handling and set-up time to a fraction. ***On a C-F Positioner weldments and assemblies can be welded down-hand on ALL sides with a single set-up;*** can be revolved completely around and tilted to any point up to 135° from horizontal. C-F Positioners come in capacities from small hand operated positioners to large variable speed giants that twist and turn 30,000 lb. weldments under push button control.



WRITE FOR BULLETIN WP 22.

CULLEN-FRIESTEDT CO.,
1303 S. KILBOURN AVE. CHICAGO, ILLINOIS



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

•

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

"HERCULES" RED-STRAND WIRE ROPE

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You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

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he obtained the pipe and as to its being J-55 or N-80.

The premium for threaded and coupled pipe meeting certain physical specifications is extended in the revised regulation to pipe with threads only, and premium specifications are modified.

An exception to the 20 per cent premium allowed for oil country tubular pipe meeting special physical tests is made for that used in the states of New York, Pennsylvania, West Virginia, Ohio, Michigan, Indiana, Illinois and Kentucky, where it is limited to 15 per cent. The revision permits caliper measurement to determine weight instead of requiring that the pipe be weighed.

Provisions covering allowable extra charges are expanded, and specific prices are established for cutting or threading or both. OPA said that it expects eventually to establish specific prices for all extras, but in the meantime those for which prices are not set should be charged at the same prices each dealer asked during the base period of Aug. 15 to Oct. 15, 1941.

Among other changes made in the revision are slight changes and corrections in the price tables, simplification of the reporting provision by revoking the requirement of filing invoices with OPA when the transportation charges for delivery of pipe exceed 50c. per hundredweight, a change in the shipping zone classification for pipe sold in Florida, and inclusion of all sales for export under the regulation.

•

Youngstown Issues Oil Country Price List

Youngstown, Ohio

• • • **A new price list,** dated Feb. 1, covering seamless oil country goods has been issued by Youngstown Sheet & Tube Co. This new list, while not reflecting any increase or decrease in prices, was issued to clarify the pricing of the reduced number of sizes, weights and specifications of seamless oil country goods as limited by last year's API developments and the latest list of the American Iron and Steel Institute.

These latest recommendations of API and the institute serve to eliminate a number of obsolete, odd and little used pipe sizes and types which now only served to complicate pricing procedure. The new Youngstown list, consequently, carries only 188 items as compared with a former 331 items, a reduction of 143 items.

OPA Exempts Prices On Materials to MRC

Washington

• • • **To facilitate** essential war operations of the Metals Reserve Co., the OPA exempted from price control Feb. 1 a specific list of domestically produced strategic or critical materials when sold to the company or its agents.

The action extends exemption of such transactions previously made by OPA for each separate transaction, and applies to a list of strategic or critical materials prepared by Metals Reserve Co. and approved by the price administrator. The list may be amended from time to time by joint action of OPA and Metals Reserve Co.

Idle and surplus stocks of critical materials have been surveyed and these stocks are now being acquired by the Metals Reserve Co. It is said that something like 3,000,000 tons of iron and steel may have been discovered in idle and surplus stocks, the greater part of which may be acquired by the company and resold to the steel mills as scrap and remelted. On such materials OPA has removed all price ceilings.

Because of its military importance the list is not included in the order, which is Supplementary Order No. 35, effective Nov. 27, 1942.

•

Soft Coal Rise Continues to Spread

Washington

• • • **Action to put** more of the nation's giant coal industry on a six-day production week progressed this week as OPA issued four more price schedules to cover increased production costs in bituminous coal mines in Pennsylvania, West Virginia, Maryland and Ohio. The new prices (f.o.b. mine) provide for increases in average mine realization from 18 to 25c. a ton. The increases will be passed on to the domestic and industrial consumer.

Eight cents of the new maximum prices covers operational costs other than over-time labor which have occurred since maximum prices were established for bituminous mines last April. The balance represents cost for the sixth day, which is approximately 9 per cent of the total labor cost under the five-day week.

As in western Pennsylvania the greater burden of the increase in maximum prices for the territory covered by the action will fall on the rail-

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STEELS

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Even though warehouse stocks today are not as plentiful as you and we would like there are still a substantial number of sizes in a variety of analyses available for immediate shipment. We will do everything within our power to help you make the guns and tools and ships and planes and tanks which will win the war.

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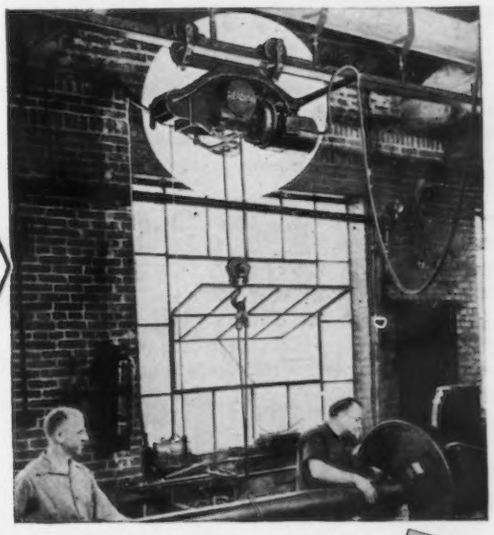


Here is a 1-ton Reading Electric Hoist that is boosting output *three ways* in a busy pipe manufacturing plant!

1. **It stays on the job all day, *every day*. No "down time" or idle machines while the hoist needs repairs.**
2. **It *speeds* the handling of pipe to and from machines.**
3. **It *keeps safety records clean* by steady, sure handling of each load.**

And those are just three of the "reasons why" it pays to rely on Reading's engineering ability when you have a hoist problem to solve.

Useful DATA in this 16-page booklet can help you get the most from every dollar you invest in hoists. Contains photos of parts and installations. A note on your company letterhead will start your copy of "Modern Materials Handling Magic" on its way to you.

Reading Chain & Block Corporation, 2101 Adams St., Reading, Pa.

READING CHAIN HOISTS·ELECTRIC HOISTS OVERHEAD TRAVELING CRANES

This Week's Priorities and Prices

Certain critical materials purchased by Metals Reserve Co. are exempted from price control under Supplementary Order No. 35. (OPA-T-540)

Steel drums may not be used to pack certain products under the terms of Order L-197 as amended. (WPB-T-1692)

Iron and steel products resellers were authorized to pass on certain extras which they are required to pay the mills, and resellers may apply for new maximum prices on imported steel under Amendment No. 11 to Revised Price Schedule No. 49. (OPA-T-546)

Reusable iron and steel pipe price regulations have been revised in Maximum Price Regulation No. 230, effective Feb. 9. (OPA-T-544)

Certification plan in die-casting industry, providing method whereby metal used in special quality zinc and aluminum die-castings of ammunition components will be subjected to rigid inspection went into effect this week. (WPB-T-1713)

Heating boiler conversion parts have been placed under dollars and cents ceilings by Amendment No. 1 to Maximum Price Regulation No. 236. (OPA-1614)

New critical materials list has been issued by WPB, noting shortages in zinc, chromium and several other products. (WPB-2451)

Coated and bonded abrasive products have been put under simplified price control by Maximum Price Regulation No. 316. (OPA-T-560)

Stricter control of the use of tungsten was put into effect by the Director General for Operations with the issuance Feb. 9 of Conservation Order M-29-b as amended. (WPB-T-1746)

War model locks and lock sets using iron or steel parts to replace nonferrous parts are placed under a dollar and cents price ceiling Feb. 8 for manufacturers and jobbers. (OPA-1616)

• • •

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (For example, WPB-600 *means announcement* 600 *issued by the War Production Board.)*

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

Priority Regulations:

No. 1...Interpretation No. 1 (2-3-43) rules that exemptions included in the order which are applicable to the Army are also applicable to the Panama Canal and exemptions applicable to the Navy apply to the Coast Guard.

"M" Orders:

M-29...Amended order releases tungsten contact points from allocation control (2-4-43).

M-38-c...Amended order provides that orders with preference ratings of A-1-j or higher are no longer automatically exempted from the restrictions on the use of lead (2-2-43).

M-261...Amended order removes restrictions on use of metal strapping and wire on specified types of bundles (2-4-43).

"P" Orders:

P-126...Amended order simplifies repair requirements on refrigerating equipment (2-6-43).

"L" Orders:

L-134...Amendment (2-2-43) removes safety valves from the order.

L-170...Amendment No. 2 (2-4-43) modifies restrictions on production of farm machinery attachments.

L-197...Amendment (2-1-43) further curtails use of steel drums.

L-204...Amended order brings intercommunicating telephone sets and systems under control (2-1-43).

L-217...Amended order revokes restriction on manufacture of portable roll crushers (2-6-43).

L-237...Order places limit on production and distribution of new woodworking and light machine tools (2-2-43).

roads and heavy industrial consumers while a relatively small portion will be carried by the sizes and kinds of coal used by the domestic consumer, OPA stated.

The mechanics by which the mine price increases may be reflected at retail levels have previously been provided in revised price schedule No. 122 which ties the dealers maximum prices to those of his supplier. The Feb. 5 action is contained in amendment No. 36 to maximum price schedule No. 120 and is effective Feb. 4.

Maximum prices for all lake coals have been established on a parity with the maximums for rail coals, and off-line railroad fuel prices have been equalized with on-line railroad fuel prices in districts 3, 4 and 6. Manifestly distorted price relationships have been corrected.

•

Plane Servicing Exemption

• • • **Services rendered** in connection with the operation, repair, conversion, modification or maintenance of airplanes, engines, parts and accessories, instruments and other airplane equipment for any war procurement agency were exempted on Feb. 4 from the General Maximum Price Regulation and the Services Regulation (No. 165 as amended).

The action was taken in Amendment No. 20 to Revised Supplementary Regulation No. 4 under GMPR. The amendment does not except from price control individual contracts to repair machines and parts.

•

Chollar Resigns from WPB Facilities Division

Washington

• • • **Walter E. Chollar,** deputy director of the Facilities Division of the War Production Board, has asked to be relieved of his duties in order that he may return to active work as vice-president of the Remington-Rand Co.

Mr. Chollar came to Washington in April, 1942, to assist in the conversion program, where his work was closely related to that of the Office Machinery Branch until the formation of the Facilities Division in July of that year. As deputy director of the division, Mr. Chollar devoted a large share of his time to locating facilities needed for the aircraft program, and also worked closely with the Army and Navy in mapping production of critical items. In announcing his resignation, Mr. Chollar said that the extended operations of his company in aircraft work necessitated his return.

•

Ore Carriers Aided

• • • **NWLB granted a wage** increase of $22 per month to 660 unlicensed personnel on the 23 boats operated on the Great Lakes by the Interstate Steamship Co., Inland Steel Co., Bethlehem Transportation Corp. and the International Harvester Co. The men are represented by the National Maritime Union, CIO.

•

Two Projects Abandoned

Washington

• • • **The smallest** weekly total reported since the Facility Review Committee was established last October, two construction projects having a total cost of $193,000 were stopped during the week ended Jan. 29, according to WPB. This brought to $1,271,389,309 the total cost of all projects stopped since last Oct. 23.

Tungsten Tightened

Washington

• • • **Stricter control** of the use of tungsten, vital in alloy steel, was put into effect by the Director General for Operations with the issuance Feb. 8 of conservation order M-29-B as amended.

The amended order eliminates many of the exemptions contained in the order as originally issued Feb. 14, 1942. Among these are:

1. The exemption for orders rated A-1-J or higher.

2. The general exemption in favor of articles produced with tungsten to comply with safety regulations.

3. Blanket exemptions in favor of the Panama Canal, the Coast and Goedetic Survey, the Civil Aeronautics Authority, the National Advisory Commission for Aeronautics, the Office of Scientific Research and Development, and Lend-Lease countries.

•

Refrigerator Repair Ruling

Washington

• • • **Under the terms** of Preference Rating Order P-126 as amended Feb. 6 by the Director General for Operations, a dealer engaged in emergency repair service of refrigerating and air-conditioning systems may apply preference ratings assigned by the order if he holds a certificate of authority. The certificate, issued on Form PD-472, is evidence that the dealer is operating as an "emergency service agency," as defined by the order.

•

Crushers Released

• • • **All manufacturers** of portable roll crushers are permitted to build the five sizes listed in Schedule II of Order L-217, under the terms of the schedule as amended last Saturday by WPB. Schedule II originally restricted the manufacture of portable roll crushers to persons currently producing the sizes listed. This restriction is now revoked.

•

Steatite Talc Freed

• • • **To permit certain** essential uses of steatite talc now forbidden by Conservation Order M-239, that order was issued in amended form today by the Director General for Operations. New uses permitted are in electrical and heat insulating products (not including refractories), electric light bulbs, and experimental work. The amended order also permits use of steatite talc to accumulate inventories up to six months supply.

Jobbing Sheet Mill and Copper Plant Are Slated to Go to Chile

• • • **The acquisition** by Chile of steel and copper plants from the United States, to be operated in Chile, has been announced by Rodolfo Jaramillo, new minister of economy. It is expected that capacity of the units will suffice to meet the South American country's need of those metals.

The steel mill which has been acquired is part of the Worth Steel Co. plant in Claymont, Del. Officials of this company said early this week that while negotiations have been going on for several months past, Worth Steel had not as yet been notified of the completion of the transaction by the Chilean government.

The mill in question was described as a jobbing sheet mill, abandoned four or five years ago, and already partially dismantled. It was closed down only a few years after its construction. The mill was completely separate from the rest of the Worth plant, which manufactures steel plates.

Production capacity of the sheet mill, which will be operated in Chile, was estimated at 400 tons per week.

The transaction was announced little more than a fortnight after Chile's severance of diplomatic relations with the Axis.

The copper plant has been bought from the General Cable Corp. of Pawtucket, R. I., according to Manuel Agosin, chief engineer of the Chilean Industrial Corp., a government agency. Senor Agosin said the plants will be knocked down for shipment this month. He expects shipment to be started in about 12 weeks. Both plants will be in operation in Chile before the end of 1943, he believes. Wire for hydro-electric transmission lines will be produced by the copper plant.

Chairmen Announced for St. Louis Foundry Congress

• • • **The St. Louis** District Chapter, American Foundrymen's Association, has announced appointment of committee chairmen to cooperate with the Chicago office of the American Foundrymen's Association in handling of the 1943 annual meeting of the organization. This second Foundry Congress will be held in St. Louis, April 26, 29, and 30. Committee chairmen were announced as follows: General chairman, L. J. Desparois, (Pickands, Mather and Co.); general vice-chairman, W. Kammerer (Midvale Mining and Supply Co.); chapter chairman, C. B. Shanley (Semi-Steel Casting Co.); secretary-treasurer, John Williamson (M. A. Bell Co.).

HOOD RECEIVES SERVICE MEDAL: C. F. Hood (left), president of American Steel & Wire Co., accepts a 25-year silver U. S. Steel Corp. service medal from John May, vice-president and general manager of sales of the wire company. The presentation was made at a joint dinner meeting of the sales and operation personnel, in Cleveland.

Non-Bessemer Ore 74.7% of Total Shipped in 1942 from Superior Region

Cleveland

• • • **In the year-end summary** of grades of Lake Superior iron ore shipped by lake, the Lake Superior Iron Ore Association reported that ore from the Minnesota ranges made up 80.71 per cent of the total, with 73,566,179 gross tons shipped. The Mesaba range led with 69,650,407 gross tons, and 1,547,329 tons and 2,368,443 tons were shipped from Minnesota's Vermilion and Cuyuna ranges, respectively.

Shipments from the Michigan-Wisconsin ranges totaled 18.78 per cent of the total, with shipments amounting to 17,121,707 gross tons, bringing shipments from U. S. ranges to 90,687,886 gross tons. Gogebic range contributed 6,156,843 tons while 6,187,394 tons and 4,777,470 tons came from the Marquette and Menominee ranges. Canada's Michipicoten range contributed 467,893 gross tons or 0.51 per cent of total shipments, bringing the total ore shipped from both Canadian and American ranges to 91,155,779 gross tons. These tonnages are cargo bill-of-lading weights, which are 1 per cent less than upper lake railroad weights.

Total shipments by grades were as follows:

U. S. Ranges	Gross Tons	Per Cent of Total
Non-Bessemer	68,169,690	74.78
Bessemer	19,231,564	21.10
Manganiferous	2,509,870	2.75
Siliceous	776,762	0.85
Total U. S. ranges	90,687,886	99.49
Canadian ranges		
Bessemer	467,893	0.51
Grand total of shipments	91,155,779	100.0

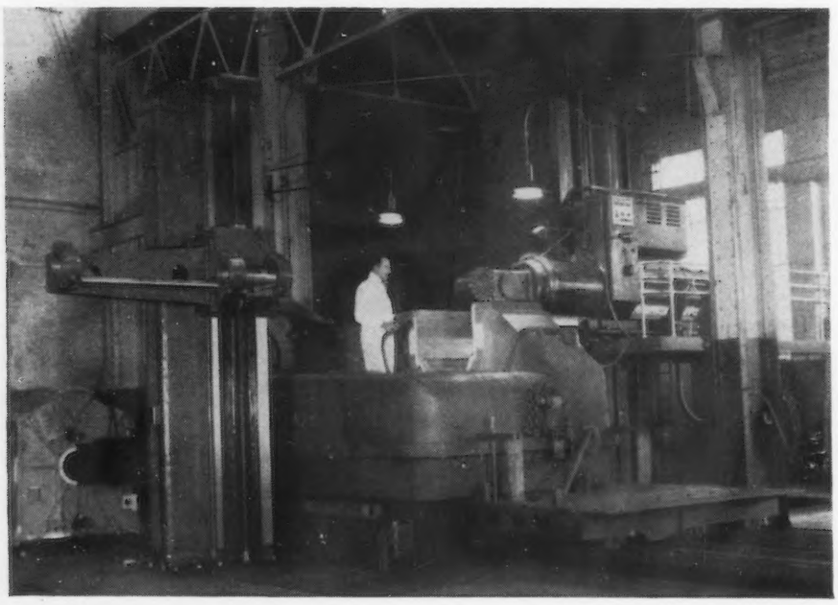
•

Iron Ore Output Set At 119 Million Tons in 1942

• • • **Iron ore production** in the United States in 1942 amounted to 119,853,000 net tons as estimated by the Bureau of Mines, United States Department of the Interior. This was an increase of about 16 per cent over the previous record figure of 103,498,728 net tons in 1941.

There were 18 states in which mines produced and shipped iron ore in 1942. Production in the Lake Superior district in 1942 (including Fillmore County, Minnesota) amounted to approximately 103,213,000 net tons, an increase of 17 per cent over the 1941 figure of 88,321,331 net tons. The southeastern states showed a 16 per cent rise in production, from 9,123,408 net tons in 1941 to 10,621,000 net tons in 1942. In the northeastern states, production amounted to 4,364,000 net tons, against 4,437,521 net tons in 1941. In the western states production last year was 1,655,000 net tons, against 1,616,468 tons in 1941.

131 TONS OF INGENUITY: Ingenuity in designing equipment to produce the materials of war is graphically illustrated in the big Ingersoll horizontal milling and boring machine installed recently at the Mt. Vernon, Ohio, plant of the Cooper-Bessemer Corp. The 131-ton milling machine is currently being used to mill and bore large motor-driven compressor beds, and to machine bed castings for 10-cylinder compressor engines. A 40 per cent saving in time has been effected on each compressor bed, and over 62 per cent on each engine job.



Swiren Blasts Railway Emergency Revenue Profits

• • • **The emergency** freight and passenger rate increases granted the railroads early last year have cost the American people $300,000,000 in 1942 and will cost them $400,000,000 in 1943 unless revoked, the Interstate Commerce Commission was informed in a charge made at the opening of hearings on the petition by Director of Economic Stabilization Byrnes and Price Administrator Brown to have the emergency increases rescinded.

OPA Experts Meet with Foundrymen to Discuss Prices

Cleveland

• • • **OPA price experts** from Washington met this week with foundry operators from Ohio, Indiana, and Kentucky at Cincinnati to discuss price regulations covering non-ferrous foundry products. The recently issued price control was the most important subject of discussion, the purpose being to give operators a clear understanding so that they will attain proper compliance.

The meeting was arranged as an open forum type wherein members of the industry questioned OPA members on the revised maximum price regulation No. 125, covering non-ferrous foundry products. Between 75 and 100 foundries were represented by some 200 attendants.

Coke Price Raised 50c.

Washington

• • • **OPA has announced** an increase in the price of blast furnace beehive coke at Connellsville, Pa., by 50c. a ton. This establishes a ceiling of $6.50 for machine drawn coke and $7 for hand drawn coke where the coal is trucked. The higher prices became effective Feb. 3. So far no change in pig iron prices has been made.

PERSONALS

• **Arthur Hjortsberg,** assistant division superintendent, central mills, Gary Works, Carnegie-Illinois Steel Corp., since Nov. 1, 1940, has been appointed division superintendent of these mills succeeding R. F. Campbell, retired. **Edwin H. Gott** who has been assistant division superintendent of maintenance since Oct. 1, 1941, has been made assistant division superintendent, central mills. **Leroy J. Eddy,** assistant chief engineer since Sept. 1, 1941, receives the post of assistant division superintendent of maintenance succeeding Mr. Gott. **J. Donald Rollins,** project engineer since Oct. 1, 1940, has been advanced to the position of assistant chief engineer succeeding Mr. Eddy. **George Chacharis,** appropriation control and project engineer since April 12, 1942, has been appointed project engineer succeeding Mr. Rollins. **George P. Burks,** second assistant superintendent of blast furnaces since April 1, 1942, has been made first assistant superintendent of blast furnaces succeeding C. V. Lauer, deceased. **Raymond W. Sundquist,** assistant to superintendent of blast furnaces receives the post of second assistant superintendent of blast furnaces succeeding Mr. Burks.

• **Chester Malysiak** has been appointed to the research staff of Battelle Memorial Institute, Columbus, Ohio, where he will assist in the conducting of research in the division of non-ferrous metallurgy.

• **Carl J. Meister** has been appointed manager of sales of Atlas Metal Stamping and Atlas Tool & Designing Companies, Philadelphia. He was formerly field sales manager for the Allen Mfg. Co., Hartford.

• **Ellsworth W. Allison** has been elected assistant secretary of the Detroit Rex Products Co.

• **S. H. Hobson** has been elected president and a member of the board of directors of the Geo. D. Roper Corp. Previous to his advancement, Mr. Hobson was serving as vice-president of the Roper company and also as president of the Blackhawk Engineering Co., which is owned by Roper.

• **Edwin O. Jones** has been named a vice-president of Federal-Mogul Corp. He continues to hold the post of sales manager. **Guy S. Peppiatt** has been elected executive assistant to president, H. Gray Muzzy.

ARTHUR HJORTSBERG, division superintendent of the Gary works of Carnegie-Illinois Steel Co.

• **John J. Fiske,** has been named electronic control specialist for the Westinghouse Electric & Mfg. Co. in the Los Angeles area.

• **Vernon E. Walters,** formerly assistant general manager of the Buffalo Arms Corp., has been named general manager of the Houde Engineering Division of the Houdaille-Hershey Corp.

• **Leon E. Jeanneret,** formerly assistant general sales manager of the Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been appointed manager of sales of the Welded Tube Division of Babcock & Wilcox, with general offices and plant at Alliance, Ohio. **Edward A. Livingstone,** general sales manager of the Babcock & Wilcox Tube Co. at Beaver Falls, Pa., will also be general sales manager of the company, Welded Tube Division of Alliance. **William J. Thomas,** manager of mechanical tube sales of the Babcock & Wilcox Tube Company, Beaver Falls, has been appointed assistant general sales manager of the company.

• **E. N. Twogood** has been made engineer of the General Electric Co., Lynn, Mass., gear department. He succeeds **A. A. Ross,** who has retired after 48 years of service with the company. Mr. Twogood has been executive assistant to Mr. Ross since 1923.

• **H. Lloyd Child,** chief test pilot for Curtiss-Wright Buffalo plants has been appointed assistant to William J. Crosswell, director of military contracts for the C-W airplane division. **E. E. Elliott** has been advanced to chief test pilot.

• **A. F. Murray** has joined the staff of the Electrolux Co., as works manager of its Old Greenwich, Conn., plant. Mr. Murray had been with Westinghouse Electric & Mfg. Co., for over 20 years.

• **Roy M. Jacobs,** president of the Standard Brass Works, Milwaukee, and former president of the Wisconsin chapter, American Foundrymen's Association, has been nominated for the post of national director to succeed **Ben D. Claffey,** Waukesha, Wis., whose term expires in May.

• **G. Stewart Crane,** vice-president in charge of sales, engineering, development and advertising of Cutler-Hammer, Inc., Milwaukee, has been selected as the man of the month for January by the Milwaukee Advertising Club and his biography is a feature of the club's monthly publication *The Torch*.

OBITUARY . . .

• **James E. Mills,** head of Smith & Mills, Cincinnati, died Jan. 23.

• **John J. McQuade,** a member of the Board of Directors of the Johnson Bronze Co., New Castle, Pa., died Jan. 26.

• **William Paul Morris,** chairman of the board of Morris, Wheeler & Co., Philadelphia, died Dec. 15, 1942. He was 75 years old.

• **Carlton G. Gilbert,** manager of the Detroit branch of Federal Products Co., died Jan. 28.

• **Charles H. Trombley,** president of Rapp-Huckins Co., Boston, died Jan. 25.

• **Oscar Wendell Edwards,** president of the Northampton Cutlery Co., Northampton, Mass., died Jan. 24. He was 79 years old.

• **Clarence J. Allen,** one of the founders of Worden-Allen Co., Milwaukee, died Jan. 25 in a Milwaukee hospital after a long illness, aged 77 years.

• **Jack H. Micka,** secretary and treasurer of the McBride Saw & Knife Co., Milwaukee, died of a heart attack at his home there Jan. 27.

MACHINE TOOLS

. . . Sales, Inquiries and Market News

Machine Tool Sales Drop Sharply in Canada

Toronto

• • • **Sales of machine tools** of all kinds have fallen off sharply in recent months. Last October a government order practically forbade the purchase of any new machinery unless the need for it could be definitely demonstrated. It was felt then that Canadian war manufacturers had greatly overbought and that most future needs could be taken care of by shifting machine tools from one plant to another as contracts ran out and were not renewed.

This has largely proved to be the case. October sales of a national distributor dropped to half the monthly average for the year up until then, and by January had sunk to almost one-tenth of this volume. Little new business is in sight. Since Canada got started on its war production program about six months ahead of the United States, it is felt that the decline in sales here may presage a similar falling off in domestic business in the United States, since similar moves are on foot to relocate machinery and to halt fresh purchases.

•

Bookings Exceed Cancellations

Cincinnati

• • • **Bookings of district machine tool** manufacturers have outstripped cancellations in the last two weeks and the industry indicates further increases in the eight to 12-month backlog already on hand. Shift in emphasis on what to manufacture is believed to be largely the cause both of cancellations and new ordering. A large percentage of cancellations heretofore reported are now indicated as having been related to the curtailed tank program. A number of facilities previously planned have been either cancelled or held in abeyance, thus releasing a large amount of machine tools originally ordered for this program.

With a shift of emphasis now on planes and the shipping needs, increased facilities to accommodate these have brought about a return to the market of manufacturers in these fields. Delivery dates on machine tools in the area are reported running from four to nine months. One substantial manufacturer of tools indicates that a four-month delivery is possible on certain small types of machines, but the market average on all types is closer to seven months.

NO BOTTLENECKS: There are no bottlenecks in the manufacture of shell fuses at the Stewart-Warner plant when this Davis-Thompson machine goes into action. Here a 19-year-old youth operates collet chuck levers on the work holding fixtures.

•

Rockford Elects New A. S. T. E. Officers

Rockford, Ill.

• • • **Leo Reuland,** Barber-Colman Co., was elected chairman of the Rockford area chapter of the American Society of Tool Engineers at the chapter's meeting last Thursday. Other officers chosen at the meeting include: First vice-chairman, Fred Swanson, Sundstrand Machine Tool Co.; second vice-chairman, Walter Lustig, Atwood Vacuum Machine Co.; third vice-chairman, Donald Hawkinson, Greenlee Bros. Co.; treasurer, Ernest Seborg, Barnes Drill Co.; and secretary, Ernst Norrman, Woodward Governor Co.

Diamond studded past chairman's pins were awarded at the meeting to E. W. Dickett, George Johnson, K. W. Lund and Henry Ruehl.

The chapter's March meeting will cover "Gages and Measuring Tools," while the April meeting will feature Maj. Alexander P. DeSeversky, who will speak on airpower.

•

Big Demand for Steel Cases Machinery

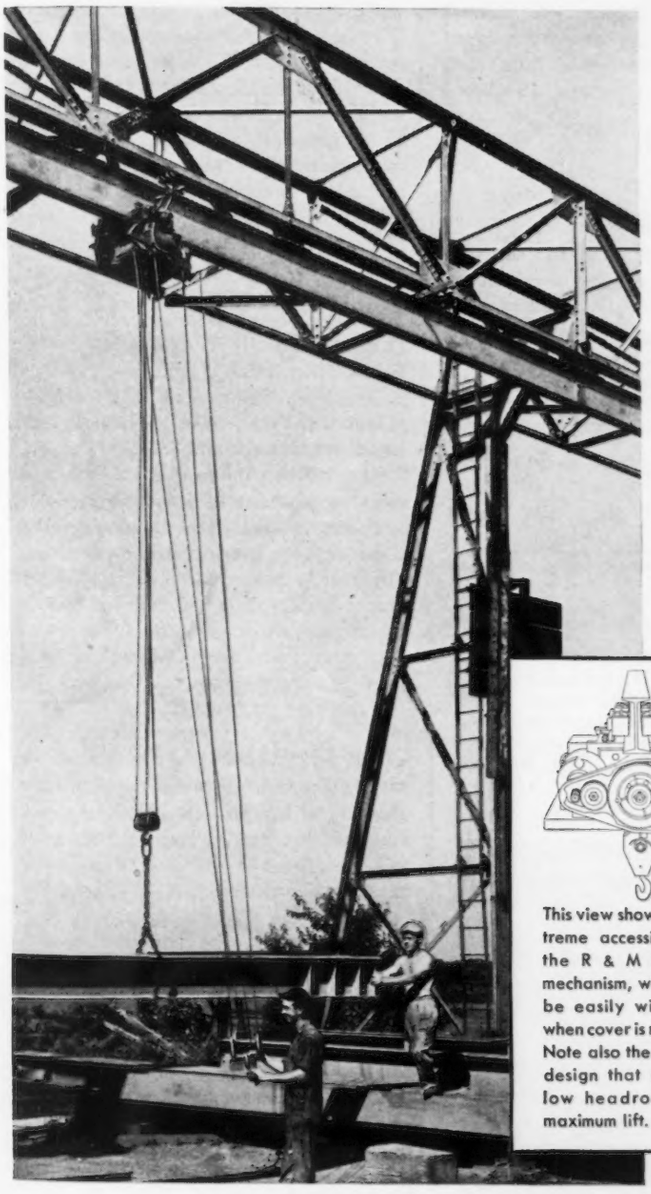
Cleveland

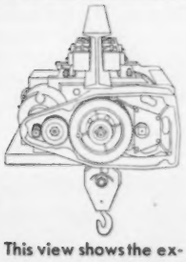
• • • **Reshuffling of contracts** and reshuffling of machine tools to plants with new or enlarged contracts seems to be the trend in the machine tool field in this area during the past several weeks. There are increasing instances where machine tools are being moved out of plants where contracts are about completed or where the tools are not vitally needed into other plants where immediate and important use can be made of them. It is felt in official quarters that more efficient use of equipment on hand is better than production of new equipment.

With the deadline of April 1 set for production of steel cartridge cases there has been an unusually heavy demand for production tools for this item. Production of steel cartridge cases has been slow, but with the new push on this item it is expected that the flow will be heavy and steady. Many of the manufacturers that have set up to produce steel cases have been in production of brass shell cases, and, since output of steel shell cases is at a rate that is just about 50 per cent as great as brass case production, many of them have suddenly gone into the market to duplicate all existing production equipment. Consequently, there is an acute shortage of such items as trimmers, heading presses, and drawing equipment. The shortage of trimmers is the most severely felt, and both suppliers and manufacturers are casting about for substitute equipment, since deliveries on trimmers now run from 16 to 20 weeks. Headers and drawing equipment deliveries now run about 16 weeks.

There are about five companies in the Ohio area that have converted to steel shell case manufacture and practically all of them are having trouble getting equipment necessary to meet the April 1 deadline.

6 R & M HOISTS Speed this Firm's War Work!





This view shows the extreme accessibility of the R & M hoisting mechanism, which may be easily withdrawn when cover is removed. Note also the compact design that provides low headroom and maximum lift.

Racing against time on grueling day and night production schedules, R & M All-Steel Hoists are winning performance and endurance citations in war-busy plants everywhere.

Their record for this large metal-fabricating firm is typical. R & M 2-ton and 3-ton Hoists—the latter mounted on an R & M Crane, illustrated at the left—have proved so satisfactory that two additional units are to be delivered soon, to help lift production to still further heights.

Production men specify these husky R & M material-handlers for many reasons. Ranging in capacity from 1000 to 15,000 lbs., they're precision-built from track to hook; they're powered by famous R & M motors; they're equipped with an oversize oil-cooled automatic load brake for safe, efficient service—with minimum maintenance.

Whatever *your* hoisting problem, "take it up" with R & M! Our expert representative will help you find the solution. Call the nearest R & M sales and service office, or write us at the factory.

R & M HOIST AND CRANE SALES AND SERVICE OFFICES

Albany.....364 Broadway
Atlanta.....319 Walton Bldg.
Baltimore, Lombard & Concord St.
Boston.....74 Needham St.
Chicago....2400 W. Madison St.
Cincinnati.....418 New St.
Cleveland..470 Rockefeller Bldg.
Denver.....1420 16th St.
Detroit.....2921 E. Grand Blvd.
Houston..3715 Harrisburg Blvd.
Jacksonville....305 Bisbee Bldg.
Meriden, Conn...135 Colony St.
Newark.....700 Bergen St.
New York.....200 Varick St.
Philadelphia....401 N. Broad St.
Pittsburgh.....H. W. Oliver Bldg.
Providence.....44 Clifford St.
San Francisco, 116 New Mtgmry. St.
Seattle.....216 Walker Bldg.
Syracuse....204 State Tower Bldg.
Montreal.....Lyman Tube & Supply Co., Ltd.

ROBBINS & MYERS • INC.

HOIST & CRANE DIVISION, SPRINGFIELD, OHIO • In Canada: Robbins & Myers Co. of Canada, Ltd., Brantford, Ont.

★ ★ ★ MOTORS • MACHINE DRIVES • FANS • MOYNO PUMPS • FOUNDED 1878 ★ ★ ★

NON-FERROUS METALS

. . . Market Activities and Price Trends

Zinc and Chromium on WPB's Critical List

• • • **The new Material** Substitutions and Supply List issued last week by the Conservation Division of the WPB places zinc and chromium among the materials that have become more critical in supply since November when the previous roster was released. This catalog is divided into three parts: Group I consists of those basic materials that are insufficient for war and essential civilian demands and in some instances for war needs alone. There are 200 such materials listed. Group II contains those essential war materials the supplies of which are in equilibrium with the demands of war and essential civilian production. Group III comprises non-critical materials, the supplies of which are ample enough to make them available as substitutes for critical materials unless the availability of these substitute materials is restricted locally by labor, manufacturing or transportation difficulties.

Harvey A. Anderson, deputy director of the WPB Conservation Division, under whose direction the list was compiled, said the shortage of zinc "is one of the principal factors which might limit the production of shells. So if your newspapers and magazines today contain fewer pages and pictures than during peacetime, it's because our armed forces need every available pound of zinc. Only copper and aluminum, among large tonnage metals, are as scarce."

The supply status of materials on the list is determined by such factors as domestic production, imports, stockpiles, United Nations policy arrangements, government planning and regulations, claimant agencies needs and substitution possibilities. A change in the situation of any one of these factors may be sufficient to make a material critical in supply. A temporary shortage of assigned shipping, for example, actually has resulted in a shortage of high grade imported bauxite, which has resulted in a shortage of calcined alumina. This situation in turn has brought about a comparable shortage of aluminum.

Mr. Anderson suggested that inasmuch as iron and steel are available in much larger tonnages than non-ferrous metals and plastics, there be a substitution of ferrous for non-ferrous metals and plastics where the amounts of critical ferro-alloys involved are not excessive. Basic iron and steel and the major lines of steel products are listed in Groups I and II.

Copies of the materials and substitution and supply list can be obtained from the Conservation and Substitution Branch, Conservation Division, WPB.

•

Procedure Set Up For Die Casting Control

• • • **A certification plan** for the die casting industry has been announced by the Conservation Division of the WPB. Heretofore the use of die castings has been restricted because of the lack of uniform quality. "By the use of the correct control methods and adequate inspection procedure, special quality die castings can be produced with greater assured uniformity for use in place of many parts now fabricated as forgings or wrought products," Harvey A. Anderson states in a letter to Army and Navy procurement offices. This will permit more rapid manufacture with greater material conservation than if such critical parts were machined from bar stock or forgings.

In order to facilitate military procurement of die castings, a die caster may upon application be considered for certification to the armed forces as a producer of these special die castings.

A plant inspection committee composed of D. Basch of the General Electric Co., Schenectady, as chairman; R. W. Waring, Sperry Gyroscope Co., Inc., Brooklyn; C. E. Heussner, Chrysler Corp., Detroit, and J. R. Townsend, Bell Telephone Laboratories, Inc., New York, will judge plant layout, equipment and methods of manufacture at the request of the die caster and recommend certification to the WPB. Inspection will include spectrographic and X-ray analysis of zinc die castings since the presence of impurities in zinc, no matter how slight, may cause castings to disintegrate. Since such rigid examination is not required for aluminum die castings, zinc and aluminum will be certified separately.

SIL-FOS BRAZING a branch outlet to a 4 in. copper waste line. The silver solder is applied on the inside and flows through the entire joint area. The flange above the joint is also brazed with the silver compound.

•

Lead Exemption Removed

• • • **Orders with preference** ratings of A-1-j or higher are no longer automatically exempted from the restrictions on the use of lead imposed by conservation order M-38-c. The original intention of this exception was to permit lead to be used where necessary for essential production, such production being then designated by a preference rating of A-1-j or higher. With the increasing assignment of ratings in the AA series, the rating of A-1-j no longer necessarily means a vital war use, and the exemption is therefore deleted.

•

Forms Simplified For Silver Fabricators

• • • **Reports required** of those who use newly-mined domestic silver in producing semi-fabricated articles were simplified and consolidated by the OPA. One report form was dropped since it was no longer necessary and four others were combined in one simplified form. The change was made through amendment No.

DPC Aluminum Plant Starts Operating 25%

• • • In spite of a publicity department that wanted "to keep the whole thing quiet," Mayor LaGuardia during his weekly radio talk announced the start of production in about 25 per cent of the units in the Maspeth, Queens, aluminum producing plant, the largest built with government funds. Officials of the Aluminum Co. of America will run the plant for the government and receive 15 per cent of the profits. The plants will be devoted solely to the electrolytic reduction of aluminum oxide.

103 to supplementary regulation No. 14 of the General Maximum Price Regulation. The reports are those to be made by persons desiring to take advantage of a pricing provision in amendment 12 to supplementary regulation No. 14 permitting semi-fabricators to add the additional cost of newly mined domestic silver used in their products to their maximum prices for similar articles containing the lower-priced imported silver.

•

Forms Due Feb. 15 For Jewelers' Copper

• • • **Applications for** authorization to use small amounts of copper scrap and copper base alloy scrap in alloying gold during the four-month period, March 1 to June 30, may be made to the Jewelry Section, Consumer Durable Goods Division, before Feb. 15, it was announced Feb. 2 by the Copper Division. Purchase and use of copper, copper scrap, and copper base alloy scrap for alloying gold have been prohibited without a specific authorization from the Director General for Operations.

•

Non-Ferrous Prices

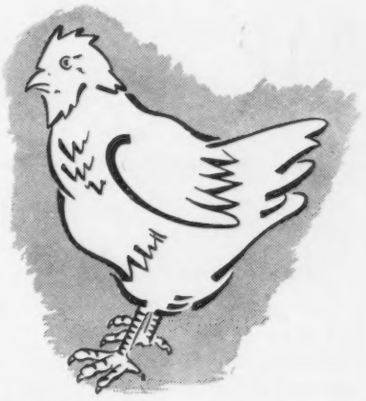
(Cents per lb. for early delivery)

Copper Electrolytic, Conn. Valley	12.00
Copper Electrolytic, New York	11.75
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-16c. a lb.; No. 12 remelt No. 2, standard, 14.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery lots of 2 tons or more. ANTIMONY, prompt: Asiatic, nominal, New York; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

How many FEATHERS in a Hen?



Our department of weights and standards, after plucking several specimens, has placed the problem back in our laps with no answer.

Many spring users have placed spring problems hard to solve in our hands to analyse and standardize. Scientific control of materials, close supervision of manufacture, automatic heat-treating, and accurate inspection and testing will give your springs a uniform degree of performance that eliminates kick-backs.

Buy springs that give known performance!

DUNBAR SPRINGMAKERS

SPRINGS WIRE FORMS SMALL STAMPINGS

DUNBAR BROS. CO., Bristol, Conn.

Division of Associated Spring Corporation

Symbol OF INTEGRITY

GATX GENERAL AMERICAN

100% Devoted to War Production

PLATE & WELDING DIVISION

PLANT AT SHARON, PA.

Plate and Welding Division

GENERAL AMERICAN TRANSPORTATION CORPORATION

SHARON, PA.

SCRAP

. . . Market Activities and Quotation Trends

Scrap Front Quiet; OPA May Revise Prices

• • • **This week in** the scrap market has been one of the quietest in some time. Most districts report both slow inflow of material for processing and extremely poor demand on the part of the consumers. Bad weather in some districts has slowed both collections and yard activities but most disappointing to dealers has been the apathy of the mills to buy.

The situation in turnings has not improved noticeably and some observers expect OPA to again revise their price set-up after viewing the dissatisfaction in the trade and the reluctance of mills to buy certain grades.

Many mills, particularly in the East, are not taking shoveling turnings at the new price but are accepting crushed turnings at the new higher figure. Machine shop turnings, now priced $1 lower, are said by the mills to be of poor quality and dealers are suspected of removing short turnings from this grade to sell at the new premium price.

The manpower shortage in yards is still reported to be the biggest factor in the scrap trade today with little hope of any assistance. One point that may work in favor of the industry is the rumor that all salvage workers will be placed on the deferrable list so far as the armed services are concerned which may draw some laborers from mills where in spite of higher wages the draft security is not provided.

All districts report that mills are fairly well supplied and there is no note of urgency at the moment with regard to yard movements. Allocations which have been a big factor in the past are playing a less important part in scrap movement according to this week's reports.

Tin Can Collections Show Increase in Allegheny Co., Pa.

Pittsburgh

• • • **From Nov. 1 to Feb. 1** approximately 993 tons of tin cans have been collected in Allegheny County's grocery store pick-up collection. Of this total, collections supervised by the Civilian Defense Council amounted to 787 tons, while a municipally sponsored Sunday collection by the City of Pittsburgh accounted for approximately 206 tons.

January figures, included in the above totals, showed 206 tons for the City of Pittsburgh campaign and 280 tons raised under the supervision of the Civilian Defense organization. According to reports here, February collections by the Civilian Defense are running at a rate in excess of the January collection.

The programs are part of the national drive in which the housewives clean and flatten cans and take them to the nearby grocery store or other station of which there are approximately 3000 in Allegheny County. In the Civilian Defense drive collections are made by the soft drink manufacturers of the county and sold to a de-tinning company, the proceeds going to finance the work of Civilian Defense. Tin cans collected by the city are also sold, the proceeds going to the city government.

All scrap remaining after the de-tinning operation has found a ready market in the Pittsburgh area.

Scrap Consumption Tops 1941 High by 4 p.c.

Washington

• • • **Consumption of iron** and steel scrap by all classes of users in 1942 is estimated at 55,841,000 gross tons by the Institute of Scrap Iron & Steel Inc. This broke the previous record of 53,623,000 tons, established in 1941, by about 4 per cent.

By comparison the former peacetime high of consumption was 38,006,272 tons, in 1937. The greatest consumption during the first World War was 26,800,000 tons, in 1917.

Of the 55,841,000 gross tons consumed in 1942, approximately 31,000,000 tons was recycled or plant scrap while the remaining 24,800,000 tons was purchased or dealer scrap, coming from automobile wrecking, peddler collections, farms, salvage drives, demolition projects and the railroads.

In addition to the record consumption in 1942 consumers increased their inventories by about 1,500,000 gross tons, it is estimated by the Institute.

District Markets

NEW YORK—During last week, the slowest of the winter thus far, the only cheerful spark was the Truman Committee's suggestion that OPA fix scrap prices high enough "to induce the scrap dealer to go out and get it," and its recognition of the turnings oversupply problem. It appears, however, that small demand is more of a woe to dealers here at present than is the difficulty of getting supplies.

•

PITTSBURGH—Supplies are relatively easy here during the past week with no sign of serious deficiencies. It is understood that industrial scrap is coming out in quantities sufficient to cause some turndowns on offers of dealer scrap. The spectre of shortage has disappeared completely, although most observers keep their fingers crossed from force of habit.

•

BUFFALO—Scrap operators reported little activity during the week despite a sharp improvement in weather. Most yards remained long on items mills have been refusing to take for the last three weeks and short of materials in demand. While droves of men were reported seeking essential employment after the work or fight edict from Washington, the short-handed scrap yard proprietors failed to get so much as a nibble.

•

BOSTON—Despite the unsettled turnings situation, a Butler, Pa., mill continues to take such material as fast as certain shippers obtain supplies, and yards and brokers report an occasional car of heavy melting steel and borings going to other mills. Business in general, however, is quite slow. Snow and ice conditions and lack of mill buying interest are the contributing factors to business conditions.

•

ST. LOUIS—With better weather there has been a much heavier movement of scrap iron to the mills here than for some time. Piles at mills range from two weeks to 30 days' supply. The

greatest problem continues to be a shortage of labor to handle the scrap in dealers yards. The movement from railroads has eased up a bit.

•

CLEVELAND—The scrap yard labor situation is the one factor that is limiting scrap flow into the mills in this area, and it was stated by some yard men that scrap is being refused by the yards because of their inability to handle it. While any attempt to solve the labor problem is almost hopeless, mainly because yards can't compete with war industries insofar as wages are concerned, a committee has been established by the Northern Ohio Chapter of the Scrap Institute to deal with this problem. Supplies into the mills are quite steady, with stocks ranging from 6 to 10 weeks.

•

CINCINNATI—While scrap is not as plentiful in recent weeks as it was during the influx of the recent civilian drives, users in the area are apparently adequately supplied for the next three or four weeks. Railroad lists show a below normal offering, although most of the material is in urgent demand. Current drives to get out agricultural scrap in this area is producing fair results, but dealers are holding in abeyance any opinion on the drive results until complete inspection of material, they having profited by their experience in the low grade of a substantial part of the scrap produced in previous civilian drives.

•

BIRMINGHAM—The scrap situation in this district shows little change in trend. All grades remain fairly plentiful and steel mills are adding to inventories.

•

PHILADELPHIA—Things are quiet here with the supply plentiful. It is believed that if a pinch develops in this district it will result from manpower and transportation shortages, rather than lack of material. No recent allocations have been received by dealers.

•

CHICAGO—Movement of scrap through dealers' yards and into consumption is still below levels prevailing before the recent cold spell. However, most mills still have sufficient reserves to make up the difference for some time yet. The labor situation in dealers' yards is steadily deteriorating and is partly responsible for the lower processing volume. No action has been taken yet on request of local dealers for permission to raise yard wages.

$322,000 Profit Earned By Taylor-Wharton in 1942

• • • **George R. Hanks**, president of the Taylor-Wharton Iron & Steel Co., announced a net profit for 1942 of $322,012. This was after provision of $1,160,000 for taxes and $100,000 for contingencies. For 1941, the net profit amounted to $312,500. During the past year the company paid dividends amounting to $1.70 per share on 83,832 shares held by the public, or a total of $142,513.

ANY METAL • ANY PERFORATION

Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

The Harrington & King PERFORATING Co.

5657 FILLMORE STREET—CHICAGO, ILL.
New York Office, 114 Liberty Street

How to *Increase Production* on Pressing, Forming, and Stamping Operations

Hannifin Pneumatic Arbor Presses give you accurate, controlled pressures, adjustable to suit the job, and simple hand lever or foot pedal control. By comparison with mechanical presses requiring hand or foot operation, work can be done faster, more uniformly, and with far less operator fatigue.

Hannifin Arbor Presses are built in a wide range of standard types, capacities 560 lbs. to 49,000 lbs. at 80 lbs. air supply. Write for Bulletin 46-A giving complete specifications.

Ratio arm type arbor press built in capacities up to 49,000 lbs., using 80 lbs. air supply. Many other types available, both bench and floor models. Alemite lubrication standard on all types.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue • Chicago, Illinois

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES										
							Low Phos.		Heavy Structural and Plate			Foundry Steel					
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shoveling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings, Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

*Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles; No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.50
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas Oklahoma, Texas and Florida.

Group C: States not named in A and B: switching district of Kansas City, Kan., Mo.

"Tailoring Shops" for U. S. Air Force Planes Give Axis Surprises

Washington

• • • **The United States** has established a chain of aircraft tailoring shops, "modification centers" where standard mass-produced fighting planes are swiftly altered to meet requirements of campaigns throughout the global war, the Office of War Information announced recently.

These centers are operated by airlines and aircraft factories under the supervision of the U. S. Army Air Forces Materiel Command's Production Division, or directly by the air forces at air depots.

Defining broad objectives, an official air forces spokesman states, "Suppose you make kitchen stoves. Your factory is tooled up for one model on a mass production basis and you are turning out thousands of them. Then your salesmen tell you that you've got to add another gadget or your competitors are going to put you out of business. Which is easier —retooling your plant or adding another little shop where the gadget can be installed on the mass-production stoves before they meet the competition.

"That's the basic function of all our modification centers. We add, subtract, and change to meet and beat our competition—the Axis. We can take production airplanes and fit them for arctic or desert operation, increase their range or build up their bomb loads."

Although exact locations of the modification centers are closely guarded military secrets, it can be revealed that they are spotted on direct routes between the aircraft factories and battlefront destination of the planes, and that they are placed well back from the coasts.

The centers service both Army and Navy planes. A B-26 medium bomber, refitted as a torpedo plane, is an example of the type of work done.

General Jimmy Doolittle's Tokyo raiders were equipped for their special mission at the centers, as were the American bomber that rained havoc on the Roumanian oil fields last spring. A majority of the aircraft now being used against the Axis in the Solomons, New Guinea, China, the Aleutians, and North Africa are modification jobs. The Japanese met disaster from modified fighters and bombers at Midway.

Modification centers have been in operation since shortly after Pearl Harbor but until recently the lid has been tight on every aspect of their work. According to the Army Air Forces "when we make modifications, we want to catch the enemy totally unprepared. If the Japanese had known that we were preparing the types of planes we used against them at Midway, they would have known we were laying for them."

American modification centers were preceded by a similar system tested and developed by the British. In the early part of the war, some of the planes shipped from this country were not suitable for operation in the European theatre until the RAF had made necessary modifications.

Outmoded American pursuit craft, adapted to desert warfare, appeared in Libya and Egypt as highly effective strafing and light bombing planes.

In this country the modification technique underwent a successful test even before the Japanese had completed their conquest of the Philippines. The early flying Fortresses with which the Japanese had to cope lacked tail guns. Several of the big bombers were brought down because of this "blind spot." Japanese pilots learned to count on it.

But harried American pilots demanded tail guns, and got them in the B-17-E Fortress. Nearly 100 Zeros were downed before Japanese pilots learned that the old safe blind spot had begun to hammer out death.

The B-17-E was a factory modification, requiring some 900 changes. However, modification centers are every day making similar changes, though not on such a large scale. These are incorporated in later production models.

When enough of such changes pile up to warrant inclusion in production planes, preparations are made to alter the design at the factory. Retooling and conversion of manufacturing methods are readied at the factory without interrupting production. In this operation such perfection has been reached that changeover has been made without loss of one working hour on the assembly line.

However, modification centers do not cease operating when basic designs are altered. They continue as before, incorporating up-to-the minute improvements in fighting craft without interrupting the flow of production from the factories. They are constantly fitting production planes for emergency missions and conditions prevailing in specific theaters of the war.

Personnel of the centers is largely made up of civilian recruits from the aircraft companies and commercial airlines. About the same percentage of women is employed as in aircraft factories. No matter how difficult a problem may develop, these specialists are asked to solve it virtually overnight—and usually do. This despite the fact that in many cases they must work on planes staked out in the open, regardless of snow, rain, or sweltering summer heat.

War Department officials declare that in size and scope the system is growing. As one example, a new $12,000,000 modification center is now under construction somewhere in Alabama. Spokesmen for the War Department also promise that from American modification centers, as well as from aircraft factories, new shocks for the Axis may soon be expected.

CANADA'S SUPERWOMEN BUILD CARGO SHIPS: At an East Coast Canadian port, more than three hundred women, side by side with their menfolk, are tackling the heaviest sort of work helping to build 5,000 ton cargo ships. The women have been trained as riveters, bolters, painters and for a variety of heavy duty jobs. *Acme*

Comparison of Prices . . .

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Feb. 9, 1943	Feb. 2, 1943	Jan. 12, 1943	Feb. 10, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Feb. 9, 1943	Feb. 2, 1943	Jan. 12, 1943	Feb. 10, 1942
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.00	$6.00	$6.00	$6.00
Foundry coke, prompt	6.875	6.875	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 155 to 160.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 9, 1943	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	HIGH	LOW	HIGH	LOW	HIGH	LOW
1943	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1942	2.30467c.,	2.30467c.,	23.61	23.61	19.17	19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.07¢	3.33¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	$4.50		$4.50												
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.39¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[13]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢[13]	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70c)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70c				2.70¢		Bethlehem, Massillon, Canton = 2.70c)					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
								(Coatesville and Claymont = 2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.73¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.47¢	2.75¢		2.28¢	2.22¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70c)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.35c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8-in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base. On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.30c. established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMIFINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend-lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; on lend-lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton for sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

SEMI-FINISHED STEEL

For exceptions, see preceding page

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton $54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 3c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35			.10/ .20	.45	9.00	.95c	$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35			.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	20/ 30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.90	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9637	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00

***Recommended for large sections only.**

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

BRONZE BEARING SERVICE GEARED TO WAR NEEDS

● Bunting Bronze Bearing Service provides the speed, efficiency and quality of product that meet war-time requirements for machinery production and maintenance. Ready-for-assembly Bunting Bronze Bearings for machine tools, electric motors and all kinds of industrial equipment are available from stocks maintained in all principal cities. Factory-finished Bunting Bearing Bronze Bars in hundreds of sizes save metal, time, labor, tools in machining operations. Ask your wholesaler. Write for catalog. The Bunting Brass & Bronze Company, Toledo, Ohio. Warehouses in All Principal Cities.

Bunting

BRONZE BUSHINGS • BEARINGS • PRECISION BRONZE BARS

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:

(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	**U.S.S.**	**S.A.E.**
7/16 in. and smaller		64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove Bolts

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets (7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws

Per Cent Off List

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Filister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect new 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	*$25.53*	*$25.03*	*$26.53*	*$26.03*	.....	.....
Brooklyn	*27.65*	.....	.....	*28.15*	.....	.....
Jersey City	*26.62*	*26.12*	*27.62*	*27.12*	.....	.....
Philadelphia	*25.89*	*25.39*	*26.89*	*26.39*	.....	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....	.....
Everett, Mass.††	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	*24.68*	*24.68*	.....	*25.18*	.....	.....
Canton, Ohio	*25.47*	*24.97*	*25.97*	*25.47*	.....	.....
Mansfield, Ohio	*26.06*	*25.56*	*26.56*	*26.06*	.....	.....
St. Louis	*24.50*	*24.00*	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	.....*$31 34*
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	*26.76*	.....	*27.26*	*26.76*	.....	.....
Duluth	24.50	24.00	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	*27.25*	.....	.....	.....	.....	.....
San Francisco	*27.25*	.....	.....	.....	.....	.....
Seattle	*27.25*	.....	.....	.....	.....	.....
Provo, Utah	22.00	21.50	.....	.....	.....	.....
Montreal	*27.50*	*27.50*	.....	*28.00*	.....	.....
Toronto	*25.50*	*25.50*	.....	*26.00*	.....	.....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge $30 for charcoal iron at its Delta, Mich., furnace.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS			ALLOY BARS		
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	$4.00	$4.75	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$6.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.63	4.90	3.95	3.31	3.55	3.55	3.85	4.06	7.31	5.86	8.56	7.18
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.43	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.77	6.07	8.91	7.26
Birmingham	3.45[3]	4.78	4.75[1]	3.70[3]	..	3.55[3]	3.55[3]	3.50[3]	4.43	.....	.....	.....	.....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	5.00	5.05	4.00	....	3.70	3.70	3.85	4.04	.....	.....	.....	.....
Cincinnati	3.42	4.37[2]	4.92[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	4.50	5.40	4.10	....	4.05	4.05	4.00	4.15	.....	.....	.....	.....
Washington	3.60	5.10	5.15	4.10	....	3.80	3.80	3.95	4.03	.....	.....	.....	.....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	4.77	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	.....	.....	.....	.....
Memphis	3.85	4 66	5.25	4.10	....	3.95	3.95	3.90	4.31	.....	.....	.....	.....
New Orleans	3.95	4.95	5.25	4.20	....	3.90	3.90	4.10	4.60	.....	.....	.....	.....
Houston	3.75	5.43	5.25	4.30	....	5.25	5.25	3.75	4.50	.....	.....	.....	.....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
San Francisco †	4.55	7.55	6.60	4.50	....	4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
Seattle †	4.65[7]	6.63	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	.....	8.00	.....	.....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.: galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.

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BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago. $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe) Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

Ferroalloys

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton, (carloads) $135.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$36.00
Domestic, 26 to 28%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*

For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.

*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Carloads, Bulk)

3 carbon	$120.00
2.50 carbon	125.00
2 carbon	130.00
1 carbon	140.00

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrotungsten, 100 lb. and less	2.25
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

LAKE SUPERIOR ORES

(51.50% Fe., Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

COKE*

Furnace

	Per Net Ton
Connellsville, prompt	$6.00

Foundry

Connellsville, prompt	$6.75 to $7.00
By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

*Maximum by-product coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, 1941, p. 94B. Maximum beehive furnace coke prices established by OPA, Jan. 26. † F.O.B. oven.

Ceiling for operators of hand drawn ovens using trucked coal is $6.50.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Penna., Md., Ky., Mo. & Ill.	51.30
First quality, New Jersey	56.00
Second quality, Penna., Md., Ky., Mo. & Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick

	Per Net Ton
Standard or chemically bonded, Balt., Plymouth Meeting and Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00